The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXVI. NEW YORK, SATURDAY, OCTOBER 31, 1903. No. 18.

THE ENGINEERING AND MINING JOURNAL
MINING AND METALLURGY ESTABLISHED 1866

PUBLISHED EVERY SATURDAY,

261 BROADWAY, NEW YORK.

TELEPHONE 6865 CORTLANDT. P. O. BOX 1833.

CABLE ADDRESS "ENGMINJOUR" NEW YORK.

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THE STATE OF DEVELOPMENT work on the Baraboo iron range in Wisconsin was well shown in the article published in our columns last week. The commercial importance of this new supply of iron ores promises to be very considerable, owing to its situation, as well as its probable extent.

ON ANOTHER PAGE there appears a plea for uniformity in the publication of mining costs by Mr. W. A. Prichard. This is in line with Mr. H. C. Hoover's letter on the same subject, which appeared in our issue of July 11. By giving an example of uniformity as applied to three classes of mines, Mr. Prichard emphasizes the practicable nature of his suggestion. It is stated that the adoption of a uniform system of keeping accounts at the mines of the Rand served in a decided manner to promote healthy rivalry between the managers and stimulated efforts at economy both in mining and milling.

SOME OF THE daily papers, especially those having relations with Wall Street, have made a great deal of the closing down of certain mines on the Mesabi iron range in Minnesota. This has no relation to the state of trade, but is the usual course adopted at this season, when shipments are approaching their close, and sufficient ore has been mined to meet requirements.

ON ANOTHER PAGE, a correspondent calls attention to mining possibilities in China, and to the great importance which attaches to future developments in that country. It has long been partially known that China is rich in coal, iron, and in the ores of many important metals, and the work now in progress seems likely to establish the truth, which has been heretofore only surmised. While we think that our correspondent's picture of the "commercial yellow peril" may be somewhat overdrawn, we have no doubt that the question of mining in China and the interest of Americans therein deserves the careful consideration which the letter invites.

IN MANY OF our western mines, as well as in the iron mines of the Northwest, a variety of nationalities is found, but it seems probable that the mines on Douglas Island in Alaska—including the Alaska Treadwell and the Alaska Mexican—can show a greater variety than almost any others in this country. The table given elsewhere shows that the list includes Americans, Swedes, Norwegians, Danes, Scotch, Austrians, Slavonians, Irish, German, French, English, Italians, Finns, Russians, Japanese, Indians, while one solitary Turk brings up the rear of the list. The largest proportion shown in the table is that of Americans, 26.5 per cent. Norwegians and Danes, taken together, were 25 per cent, while the Austrians and Slavonians, also given together, were 24.5 per cent. The total number of men on the list is 824, and the division of these among 17 nationalities is quite a sufficient variety, one would think, to show the cosmopolitan nature of our population. The only mystery is how the Turk should have found his way to the coast of Alaska, and what special work he is doing in the mines there.

THE AWARD OF the Alaska Boundary Commission removes a cause of continued dispute and irritation which might have led to serious results, had it remained under discussion. We regret that our Canadian neighbors should show their disappointment over the decision, though the feeling is a natural one. Historically and geographically, it seems to us that the award was justified, and this belief is strengthened by the acquiescence of so eminent a jurist as Lord Alverstone. The Canadian commissioners and counsel made the best possible showing for their side, and deserve all credit for their work, even if theirs was the losing side. At any rate, the boundary is now settled for all time, and this is a source of satisfaction for everyone concerned.

The general interest aroused by the arbitration shows the enormous growth of Alaska and the Yukon territory in productive value and in popular estimation during the last five or ten years. Before that time, it would have been hard to arouse any general interest, either in the United States or Canada, over the precise boundaries of what was, apparently, a barren and useless country, with the exception of the few mines on Douglas Island and scattered elsewhere along the coast. Gold—with probably copper, petroleum, and other valuable metals and mineral products—has changed all that, and the barren, frozen northern country forms a most valuable asset of both countries; one worth a contest, at law, fortunately, and not by arms.

WE GIVE, on another page, an abstract of the recent decision of the United States Circuit Court of Appeals in the case of the Bradley electric furnace patent. This decision is an incident in the long litigation between the Electric Smelting & Aluminum Company—which owns the Cowles and the Bradley patents—and the Pittsburg Reduction Company. The present decision maintains the validity of the Bradley patents which appear, according to the Court, to cover the separation of aluminum in the electric furnace, and, therefore, to take precedence of all the other patents now in use. Should this decision stand, it will give the owners of this patent, which still has several years to run, a practical monopoly of the use of the electric furnace, not only in the manufacture of aluminum, but also in the winning of other metals, in all cases where the heat is applied internally, or directly from the electric arc. In view, however, of the great importance of the decision, it is probable that an appeal will be allowed to the United States Supreme Court. Ordinarily, the decision of the Circuit Court of Appeals is final in patent suits, but in special cases the further appeal to the Supreme Court can be allowed.

An illustrated description and analysis of the Bradley patents was given in the ENGINEERING AND MINING JOURNAL of February 27, 1897. The claims of the principal patent were there given in full.

A SOLEMN WARNING FROM LONDON.

In committing Mr. J. Whitaker Wright to the serious consideration of a grand jury at the Old Bailey police court, the Recorder of London is reported to have expressed the hope that the incident would serve as "a solemn warning to persons of high position against lending their names to commercial enterprises of which they had no particular knowledge, and in which they became the prey of wicked men, who, by means of their names, victimized the public." We trust this advice will eventually meet the eye of Admiral Winfield Scott Schley, Senator John P. Jones, and Generals Marion C. Butler and Frank C. Armstrong, the directors of the Mexican Mining and Exploration Company, whose prospectus was severely criticised by us in our issue of May 2. Shortly afterward we were informed of the withdrawal of the prospectus, but now it appears that further activity has been revived in the solicitation of funds for the purpose of exploring a certain unproved tract of 165 square miles in Mexico. A circular is being distributed by Clark & Company, of Washington; this is signed by the gentlemen above mentioned. The circular starts out by saying that "the undersigned have recently made a thorough inspection" of the company's properties, and have found a zone which is of "extraordinary mineralization," offering "possibilities practically without limit." "There is ample wood for fuel on the property," as well as "a large body of excellent grazing and agricultural land nearby." Finally, "the Asuncion mine is in bonanza ore which seems to be practically without limit."

The last remark speaks volumes for the mining knowledge of the distinguished gentlemen who are so childishly unaware of the fact that the training which gives to one "the applause of listening senates to command," which fits another to lead marshaled legions and enables a third, like Drake of old, to sweep the Spaniard off the high seas, is useless in appraising the value of a mine or in the subsequent management of technical affairs connected with mining properties. The dreary mess into which Mr. J. Whitaker Wright led the Marquis of Dufferin, Sir William Robinson, Lord Loch and other titled incompetents—that is, incompetent to direct the operations of a mine, however endowed with genius in other directions—should warn the distinguished directors of the Mexican Mining and Exploration Company that they are playing the fool, and that their united opinion of a mine is of no value whatever. The only report on a mine that is valuable is the report of a mining engineer. Each to his trade. *Ne sutor supra crepidam.*

THE BUTTE SHUT-DOWN.

The mining sensation of the week has been the action of the Amalgamated Copper Company in ordering the closing of its great mines at Butte, and also, according to reports, its reduction works at Anaconda and Great Falls, its coal mines, coke ovens, and its lumber mills at various points in Montana. The shut-down went into effect on October 23, and may be for an indefinite period. By it the copper production of Montana is reduced some 500,000 lb. daily, and possibly 12,000 men are thrown out of employment. It is the latest outcome of that bewildering tangle of litigation which has emphasized the defects of the United States mining law and debauched the politics and corrupted the judiciary of a State.

Judge Clancy of the district court at Butte, on October 22 gave his decision in two cases. One was the famous Minnie Healey case, growing out of an alleged oral contract of F. A. Heinze with Miles Finlan, a former owner of leases and options on the Minnie Healey. Finlan subsequently sold his holdings to the Boston & Montana Company and repudiated any agreement with Heinze. This case was decided in Heinze's favor by Judge Harney a year or more ago. Charges of gross misconduct and corruption were made against Judge Harney by attorneys for the Boston & Montana Company, the Supreme Court granted a new trial, and Judge Clancy decided the case in Heinze's favor.

The other case, which has also been before the courts some time, was that of John MacGinnis, who holds 100 shares of stock in the Boston & Montana Company, and is allied with Heinze. MacGinnis applied some time since for a receiver for the Boston & Montana Company, and for an injunction to prevent the Amalgamated from collecting dividends on what Boston & Montana stock it holds. Judge Clancy did not appoint a receiver, but did grant injunctions against the Boston & Montana and the Parrot Company, holding, according to the press reports, that the Amalgamated Company is virtually outlawed, with no rights as a stockholder in the Parrot or the Boston & Montana companies, basing his decision on the common law rather than on the State law.

Both cases will undoubtedly be appealed to the Supreme Court. Meantime, excitement runs high in Butte, while charges and counter-charges are made. Representatives of the Amalgamated Company claim that, being unable to get justice in the district court, the company will suspend operations until the Supreme Court has passed on the injunction proceedings. Heinze and his representatives say that there is no cause whatever for the Amalgamated Company stopping work, and that the action is merely to influence the stock market and to intimidate the district court. Heinze's latest move is to make two offers; one to leave all disputes over the ownership of the ore-bodies in controversy between him and the Amalgamated Company to a body of five men jointly selected; and the other, that McGinnis and Lamm sell their holdings in Boston & Montana and in Parrot for a stated consideration, if the Amalgamated Company will convey to him an undivided five thirty-sixths in the Nipper claim for a certain consideration, and assure him title to all the veins and ore-bodies within the claim.

The unprejudiced outsider will not be inclined to give undue value to the statements published by either side. The general policy of the Amalgamated Company, the attempts of certain persons to control the copper output of this country, the break in copper prices and in Amalgamated stock are matters of record. The tactics of the Amalgamated Company have not been those of a company organized purely for the mining and reduction of copper ores. It has been a blind pool of the blindest sort, and there is no apparent reason why some of the harsh things said of it now should not be true. On the other hand, Mr. Heinze, while displaying his customary adroitness, makes an offer which he undoubtedly knows the Amalgamated company will not accept. In effect, both sides are bluffing. Behind the charges made by each remain the sinister facts that copper prices all over the world are affected, that thousands of men are out of employment, and the litigation is as far from being settled as ever. This is not a state of affairs that any right-minded cititzen of Montana or of the United States can regard with complacency. The Butte litigation again shows the standing dangers of our mining code with its mischevious extra-lateral rights while it is a disgrace to the State of Montana that has looked on the litigation as a good thing.

A DECLARATION OF INDEPENDENCE.

A recent decision by the Supreme Court of Pennsylvania appears to have escaped general notice, although it voices in pregnant words a principle fully as important as that which went forth from Philadelphia in 1776. To those engaged in combating the tyranny of the labor-unions the following words will ring like a clarion call:

"The workman must have the unrestricted privilege of working for such employer as he pleases at such wages as he chooses to accept."

This seems reasonable enough, as reasonable as any statement expressive of the civil and religious liberty for which the English-speaking races have fought, but because it has been violated and ignored most flagrantly by organizations, mobs, and conspiracies of laborers, socialists and politicians, it now comes to us with all the sound of a new bell—a Liberty Bell—whose message should reach from the Atlantic to the Pacific and from the great lakes to the Rio Grande. If a South American dictator of a day, or a Russian Czar surrounded by a corrupt bureaucracy, were to deny that a workman had liberty to choose his employer and decide whether the wages offered were sufficient, the iniquity of such an interference with a man's freedom of action would arouse tremendous indignation; but, forsooth, because a many-headed tyranny of misguided socialists and unscrupulous agitators sees fit to deny that privilege and tries to stamp every upholder of it as a poltroon and a renegade, it passes as a part of the price of industrial progress. The Supreme Court of Pennsylvania punctuates the fallacy in simple words, which should hang over the lintel of every mine and factory in the country.

The matter arose from the threat of a strike, made by the Allied Building Trades, against the work being done on a building in Philadelphia, because certain plumbers were employed who were members of an independent union. When the contractors yielded, as contractors are apt to do nowadays, the plumbers stood on their rights and brought suit to restrain the tacit conspiracy between the trades-union and the contractors. An injunction was granted and the case finally went before the Supreme Court, with the fortunate result of eliciting the decision already quoted. While the opinion handed down does not question the right of the workmen to strike, it denies their right to combine for the pur-

pose of debarring other workmen from an opportunity to work. The Court says, further:

"Such combination is a despotic and tyrannical violation of the indefeasible right of labor to acquire property which courts are bound to restrain. It is utterly subversive of the letter and spirit of the Declaration of Rights. If such combination be in accord with the law of trades-unions, then that law and the organic law of the people of a free commonwealth cannot stand together; one or the other must go down."

In recent issues we have referred to President Roosevelt's decision in the Miller case; the resolutions of a printers' union at Washington were sufficient to lead to the dismissal of a foreman, who appealed to the President; thereupon the union was informed that its rules and regulations could not be permitted to override the laws of the United States. And if they cannot do so at Washington, it is a proper question why they should be permitted to do so in Idaho, in California or in Colorado. It is time for the imposture to be appreciated. Who are these unions that arrogate the right to lay down laws which every working man must either obey or be hounded off the face of the earth? These self-constituted tribunals insist now that all fraternal ties, oaths of office, religious allegiance, nay, the State laws and the Constitution of these United States must give way to their medieval edicts! The people who make these demands are not even representative of the class for which they claim to speak. After efforts extending over a period of from ten years, in some trades, to as much as half a century in others, the professional philanthropists who claim to work for the advancement of labor have succeeded in organizing 15 to 18 per cent of the wage-earners in the United States! While in a few restricted trades as many as 75 per cent have become unionized, it is a fact that, taking the labor of the entire country 80 per cent have preferred freedom of contract. The mining labor of the country, which owes no voluntary allegiance to the unions, is in a big majority. And the proportion would be much bigger, except for the intimidation and violence, which has led many men against their will to acquiesce in a condition which they loathe.

The recent demand of the labor-leaders for the closed shop is a confession of failure in their efforts to persuade the non-union man to place himself under their domination. At Cripple Creek the battle is being fought on a similar issue, and it looks as if the mine-owners would win in refusing to recognize the Western Federation of Miners, which insists that work shall be denied to those who do not join that organization. It will be a sorry day for liberty when working men unite with employers in insisting upon any affiliation as a preliminary to employment. If there is one principle for which the United States stands sponsor before all the world, it is the equality of opportunity to every man, the right to pursue his calling unmolested, and the privilege—to quote the text with which we started—"of working for such employer as he pleases at such wages as he chooses to accept." The attempt to compel men to enrol themselves in a voluntary organization and then to force an agreement not to accept any more or any less than a stipulated wage, is a form of tyranny contrary to every instinct of a free and progressive people. As Abraham Lincoln said: "No man is good enough to govern another man without that other's consent."

MARKET CONDITIONS.

The metal markets have been quiet with a single exception, as shown below.

In copper there has been a good deal of excitement. The news of the closing down of the Amalgamated Company's mines in Butte, involving a possible reduction in output of 15,000,000 to 16,000,000 lb. a month aroused buyers, and demand for the metal developed at once. Some large purchases were made and an advance of about a cent a pound in price is recorded. The excitement developed two facts; one that consumers are not well supplied, stocks in their hands covering, for the most part, only immediate requirements; the other was the fact, which we have frequently sought to impress upon readers, that there are no considerable unsold stocks of the metal anywhere. The shut-down is referred to at length in another column. The important point, of course, is its probable duration, but as to this there is no reliable ground for forming a judgment. The secretive policy of the Amalgamated managers, and the sudden changes in apparent policy, which they frequently make, render any attempt at prediction impossible. In London, also, the market advanced largely on Monday, but the rise was somewhat overdone, and was followed by a small reaction. We may add that foreign requirements are apparently large, and a good deal of buying for Europe is going on. It is quite certain that our exports for November and December will be on a large scale.

In tin, business has been moderate, fluctuations slight and the market quiet.

Lead remains quiet, with about the usual business doing, and no change of any importance to report.

Spelter continues easy, with a lessened demand and a downward tendency. We note elsewhere the movement of the Joplin miners to restrict production, and maintain ore prices; but so far nothing has been done of a positive nature.

Silver continues strong, chiefly on demand from the East. Shipments from New York for the week were very large. The demand for India is large, including some buying for coinage. There have been heavy purchases in the London market from a foreign source, which is not positively known, though it is believed that both Russia and Japan have been buying considerable quantities of the metal, in view of possible requirements in China and Korea.

The iron markets have again relapsed into a waiting condition, and buying, which recently started up, has been in large part suspended. This is due to the renewal belief of consumers that still further reductions in price are probable, and that it will be well to hold off a little longer. In raw materials, buying of bessemer and basic iron is at a standstill, no market for these grades being recorded. There have been some purchases of foundry iron, but mostly in small lots and at prices slightly below those heretofore recorded. The southern market has practically gone to pieces; in the West matters are a little better, but it is still evident that concessions are being made to secure business. Production is being considerably reduced in the West, over 40 per cent of the furnaces in the Pittsburg district, for instance, being closed down. Cuts have been made on billet prices by outside producers. In finished iron and steel, prices of bars have been extensively cut on large orders. Other materials are dull.

The Western coal markets are quiet. The close of the Lake season is approaching, and efforts are being made to get through as much coal as possible. The local markets are quiet, and a decreased demand is reported for coal for manufacturing purposes.

The Atlantic Seaboard bituminous trade still continues quiet, with but slight improvement. Prices are unsettled, and the outlook does not favor higher quotations. Car supply is sufficient for all demands.

The anthracite trade shows a slight improvement, with colder weather, and this improvement may be expected to continue now that November is at hand. Nearly all the collieries have shut down for a week on account of the miners' holiday and election day.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The use of crushing-rolls in mining does not go back very far. At the earliest, they seem to have come into use in the English mines, but even in these, not until the beginning of the last century.

The latest investigations made by the Department of Mines in Victoria (Australia) show that in that State the rise in temperature down to about 3,000 ft. in depth is equal to about 1° F. for every 75 ft.

As greater depth is attained in Dolcoath mine, Cornwall, the finer becomes the tin, that is to say, the particles of cassiterite become more minute. This necessitates stamping to a greater degree, with additional care in treatment of slimes. With an ore containing only 1.5 to 1.75 per cent, the treatment is a difficult matter.

Pyrite and the other common sulphides decrease in the lower levels of the deep mines of Cornwall, so that at 500 fathoms they are almost absent. When these mines were shallow, their upper levels yielded large amounts of arsenic, as a by-product from the roasting of arsenical iron pyrite. This is true, especially, of Dolcoath.

Sesquioxide of iron is a possible alternative to manganese dioxide as an oxidizer. Chlorination residues from roasted vanner concentrates are excellent for this purpose.

Platinum is obtained in ordinary placer mining, in the Urals, California and elsewhere, but its occurrence in place in the rock is very rare and difficult of determination. It has been found in the peridotite, serpentine and olivine rocks of the Urals, but so finely disseminated that careful search has but rarely proved successful.

In 1888, F. L. Sperry found a new mineral in the form of bright metallic specks in the concentrates from the Vermilion gold mine, near Sudbury, Ontario. This proved to be the arsenide of platinum, and it was named after the discoverer.

Although the United States consumed last year approximately 520,537 long tons sulphur, exclusive of the sulphur recovered from the fumes from roasting blende, its own supply was little more than one-quarter of this quantity, chiefly in iron pyrites. The bulk of the demand is still satisfied by imports of brimstone from Sicily and of iron and copper pyrites from Spain and other countries.

The steam turbine, which, many engineers think, promises to revolutionize the generation of power from coal, is, on account of its high speed, especially suited to the driving of electrical dynamos. The General Electric Company was quick to perceive this, in taking up the manufacture of the Curtis turbine engine, which it is now exploiting on a large scale.

Metallic calcium is likely to become an important industrial product, if the methods of manufacture can be improved so as to reduce the cost. It is of value as a reducing agent and as a purifier of iron. The present cost of manufacture by electrolysis is about 45c. per lb.

Every atom of matter can have associated with it a certain definite quantity of electricity called the ionic charge. Some atoms can have double this quantity, some treble, and so on, but no atom or any piece of matter can have a fraction of this quantity, which therefore appears to be an ultimate unit, a sort of an "atom" of electricity.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

CONCENTRATION AT CANANEA.

The Editor:

Sir.—Having worked at the Cananea concentrator during the whole period of its construction, I was much interested in Mr. Schwerin's article upon it, and especially admire his frank condemnation of the design of the plant. I cannot, however, agree that four sizes coarser than 8-mesh should be jigged, and each size then crushed to the next smaller. Jigs work fairly well without close sizing, and all the extra apparatus and trouble required will cost more than the saving in slimed copper, especially in this mill, which had, originally, at least a theoretical scheme for recovering some of the copper from the slimes. Such recovery would be needed in any case on account of the soft coating of copper minerals upon the pyrite grains from the Capote mine.

The statement that, as originally designed, the two jigs received all the product between ⅝-in. and 6-mesh is incorrect. Originally the coarsest trommel was only ⅜-in., a size determined by test, by a Denver firm, upon a considerable shipment of the kind of concentrating ore blocked out in the fall of 1901.

The size ⅜-in. to about 6-mesh was treated successfully in one stage, and I wondered at that time why the jigs were not worked separately, so that one of them could treat the product between the intermediate and fine screen, taking care to regulate the mesh of the intermediate screen so as to give the jigs equal work. This would have avoided the great error, which Mr. Schwerin points out, of not concentrating any material less than the mesh of the intermediate screen and greater than that of the fine one, which, at one time, was 16-mesh.

Another peculiarity of the original scheme was that the jigs were to make self-fluxing product, that is, very silicious concentrates; while the tables were to produce clean concentrates, even at the cost of copper in the tailings. This fact will help to explain the disparity in the numbers of jigs and tables.

Mr. Schwerin seems prejudiced in favor of jigs. I have seen Wilfleys, in charge of an expert, handling a very coarse product from water-classifiers. They made barren tailings, clean concentrates and a considerable amount of true middlings, to be re-crushed. The return on the Wilfley was used to take care of the middlings and concentrates not widely separated, and to neutralize the effect of the shifting of the line of division with variations in the feed. This is the true use of the return in any case. As the character of the feed varies, the Wilfleys permit an easy adjustment of the quantity, or quality, of the material thrown into each product; moreover, they subject the grains of mineral to much less rubbing friction than the jigs. This is a great advantage at La Cananea, where much of the value occurs in the soft coating on the pyrite and the rubbing will throw more copper into the slimes than the crushing. This fact was recognized in the original design, which called for small shaking screens, to keep the bulk of the jig-sizes out of the trommels.

With the original fine screens of 16-mesh, the natural difficulty of crushing with wide rolls was experienced, and the return of the product of the rolls to the same trommels caused great annoyance, which probably led to the change to the present size of 8-mesh. It seems that the tailings from the jigs are still run through the elevator to these fine screens, instead of passing directly to the rolls. This is entirely unnecessary, and gives additional wear upon both the screen and the soft mineral.

I consider the entire absence of any attempt to separate barren tailings from middlings one of the great weaknesses of the design. With the jigs set for dirty concentrates there is no reason why much of the barren quartz cannot be thrown out here. This becomes economical when the excess of copper in these tailings, over that in the coarser part of the present waste, is less, in dollars and cents, than the interest and maintenance charge on the extra machinery required to crush and treat them. In the Veta Grande ore, at least, there is much coarse quartz that is absolutely barren. The crushing of this extra gangue also tends further to foul the re-verted water and to lower the grade of the re-treated slimes.

The water used in the mill is returned from settling tanks, but otherwise no attempt is made to economize its use. This economy could be effected by such simple means as spitzkasten, to take the excess water from the through-size of the trommels, and use it as under-water for the jigs, or by employing the excess in the table feed for preliminary wash-water. Water is very valuable at La Cananea, and this economy would also save the tables from being "drowned" and, with less water in the tailings, the existing settling tanks would return "thinner" water.

Again, in spite of the side-hill location and the expensive excavation and retaining walls, there is a great deal of elevating of ore and water from the extreme bottom of the mill to the top. A large part of this could be easily avoided, by slight changes in the arrangement of the machinery. According to the original design, the water and the fine concentrates were discharged by the conveyor directly into the elevator-boot, and allowed to drain in the bin above. The present awkward method, of shoveling the concentrates, was the result of the unexpected fact that chain-elevators with 9-in. links will not discharge fine concentrates which are soaking wet!

Besides compelling the tables to treat an unnecessary amount of barren quartz, their capacity is further cut down by giving them an unclassified product. Each table gets material varying from 8-mesh to slime, and there is no excuse for the substitution of special, clumsy and inexact mechanical pulp-distributors for the customary classifiers.

The entire mill, with the mechanical features and minor difficulties of operation, was fully described by me in the 1903 *Blue Print*, published by the Engineering Society of the University of Nebraska, to which interested persons are referred.

A. A. STEEL.

New York, Oct. 12, 1903.

WHAT CONSTITUTES A SLIME?

The Editor:

Sir.—As an extension of Mr. Sharwood's article in your issue of October 10, I desire to further accentuate his point that the application of the term 'slimes' to all very finely comminuted ore often leads to confusion, for the reason that such finely divided ore is often leachable, and, when disseminated through the coarser sands, does not necessarily so clog the interstitial spaces as to render a charge impermeable. Excessive communition of an essentially frangible ore will, of course, produce a grade of 'fines' which is practically unleachable; but, as ores are actually crushed, the quantity of such material would remain so small that proper distribution in filling vats would permit the leaching of the whole pulp.

I cannot agree with Mr. Sharwood that a definition of 'slimes' must consider them "a product of some process." They are not slow in settling, nor impermeable, because of any effect of crushing, but because of (1) apparent density, due to an originally flocculent condition, or (2) to the circumstance that each particle possesses one dimension excessively small relatively to the other two dimensions. Argillaceous material may be considered as fulfilling the former condition, and sericite is a good example of the second. Few ores are free from both, and, in fact, most ores contain both, in varying proportions. Flocculent material possesses two distinct disadvantages. It fills and clogs the interstitial spaces between the sands, and when *en masse* and under compression, even from the weight of a charge of pulp when settled, each particle flattens out, the ultimate effect being that of superimposed scales, overlapping and forming a perfect seal against percolation. The second class of slimes, though they may possess an actual density as great as quartz, are, by nature, of a scaly form. Were these entirely circular, with the center of gravity in the center of the mass, a particle once headed downward would fall with normal acceleration; but such a condition does not exist, and, the resistance developed on one side of the scale being greater than would occur on the other, it is deflected from a vertical line, and tends to fall by a series of oscillations, or zigzags. When to this is added the disturbance due to convection currents, which hinder the settling of all finely divided particles, the cause of slow settling becomes apparent. Here, as in the former case, overlapping scales produce an impermeable layer.

It seems to me that true slimes are the result of an original condition of a part of the ore, and that in metallurgical literature, where we seek to be exact, a sharp distinction should be drawn between 'fines,' which are a result from crushing, and 'slimes,' which are due to the mineralogical character of the material treated.

COURTENAY DE KALB.

Mohave, Cal., Oct. 19, 1903.

RAW SULPHIDE SMELTING.

The Editor:

Sir.—In reply to your ten questions in regard to raw smelting, "that is, the smelting of sulphide ores without previous roasting," I shall endeavor to answer them in the order in which they are given, and trust my replies will be as interesting to the readers of your valuable paper as the replies of others to the same questions will be to me.

1. *"What types of ore are suited to the process?"*

Types of ore containing gold, silver, copper and lead, if the value of the lead is less than the additional cost to roast and then smelt in a lead furnace, which requires more fuel than the so-called pyritic process.

We put all ores containing less than 10 per cent lead, unless a carbonate, into the matting furnace, and sometimes ores that contain more than 10 per cent lead, if it is refractory—that is containing a high percentage of zinc and arsenic.

While answering No. 1, I deem it advisable to answer No. 9 at the same time: *"What are the limitations of the process?"*

This depends a great deal on the local conditions. Where a company is running a custom smelting plant, and can dilute the zinkiferous ores and concentrates from one mine with the clean silicious ores from another by judicious mixing, zinc ores can be worked off, no matter how much zinc they contain.

Again, if base ores are plentiful, and contain sufficient values to allow what is usually accepted as a fair treatment, the smelter can treat silicious gold and silver ores very cheaply, so that when competing with small milling and concentrating plants where the cost of milling or concentrating is at least $2 per ton, add this cost of milling to the cost of marketing the concentrates, wear and tear of the plant, and the loss in the slimes and tailings (which is generally 15 to 40 per cent of the silver, from 10 to 25 per cent of the gold, and from 15 to 50 per cent of the copper, if the ore contains any copper), and it will come to an amount equal to the cost of smelting, that is, if the mine is conveniently located for shipping to a local smelter, by rail. Of course, the richer these silicious ores are in precious metals, the greater the loss in dollars and cents, and the easier it is for the smelter to compete with the concentrating or milling plant.

But, in the San Juan region of Colorado, Yavapai county, Arizona, and other sections of the country, the concentrating mill is a great benefit to the smelter, as crude ores as they are produced from the mines, even if they contain values to stand smelt-

ing direct, are often too silicious, whereas by wet concentration, the concentrators, by concentrating the lowest grade of ores, are not only putting from 65 to 85 per cent of the values of anywhere from two to fifteen tons of low-grade ores into one ton of concentrates, *i. e.*, if the ore is at all suitable for concentration, but at the same time are eliminating the silica, and producing a basic concentrate to be shipped to the smelter, which it in turn can utilize as a base to flux the richer but still silicious ores that are shipped from the mines direct without concentration.

2. *"Is hot blast advisable?"*

To this question I must emphatically say Yes, for the following reasons:

Increased capacity of the furnace. (Of course the increased tonnage is partly offset by having a decreased amount of ore to smelt by preliminary roasting, on account of the loss of weight in roasting.)

Saving of fuel consumption in the blast furnace.

Saving the cost of preliminary roasting, and the saving of preparing the ore for roasting.

Brighter tuyeres, and less trouble in keeping them open.

Less trouble with ores containing zinc (as zinc seems to be more easily desulphurized in the blast furnace with forced blast, under intense heat, than it is in the ordinary calcining furnac) and the elimination of arsenic, which, so far, has not been successfully accomplished with cold blast.

The advantages in the use of hot blast, just enumerated, reduce the cost of smelting nearly half on the heavy sulphide ores, and make success possible, when success would be practically impossible with ore containing much arsenic and zinc, and small percentages of lead and antimony, which are so heavily penalized by the refineries when reduced into matte with cold blast.

3. *"To what extent can fuel be eliminated?"*

I do not think it advisable to reduce the fuel below 4 per cent on the ore and flux, although it is possible to run for days at a time as low as 3 per cent on the burden, that is, not including the weight of the fuel itself.

4. *"What amount of copper is required for the collection of precious metals?"*

This depends somewhat on the character of the ore to be treated, especially where there is much zinc. I do not think it advisable to smelt with less than 1 per cent copper on the burden, and prefer 3 per cent. Of course, ores averaging as low as one, one-half or one-quarter per cent copper can be smelted by re-smelting a small portion of the matte containing the accumulated copper over and over again with the charge, in order that it may continue to gather the values. We have an excellent illustration here of the advisability of using sufficient copper. Even when making matte as high as 15 to 25 oz. gold, and containing from 300 to 400 oz. silver with plenty of copper, by using the enriched matte over and over again in order to concentrate the copper up to the shipping point, our slags are as low in gold and silver contents as when making a matte containing only 4 or 5 oz. and 100 oz. silver with 15 lb. and less copper on the 1,500 lb. charge burden, the slag running from trace to .03 oz. gold and from .25 to 1 oz. silver to the ton.

5. *"What percentage of lime is necessary to clean the slag?"*

This depends a great deal upon the amount of alumina and magnesia contained in the ore to be smelted, as it is necessary to have a fluid slag of light specific gravity, to avoid mechanical losses in the slag, yet not so light that the fluidity of the slag is sacrificed. For these reasons I like a little alumina and magnesia in the ore, especially when we have plenty of iron and do not care to use too much lime. Of course, where parties are anxious to smelt as much silica as possible with as little flux as possible, and magnesium lime rock is available, one would naturally think it would be a very desirable flux, as magnesia has nearly twice the combining power with silica that iron has, and nearly half as much again the combining power of lime, that is for a bisilicate where 1 per cent CaO is equal to 1.07 per cent SiO_2, 1 per cent Mg would be equal to 1.5 per cent SiO_2; but we well know what an infusible slag we would get from a bisilicate of magnesia. As a rule, I have found a bisilicate slag, classing the alumina as an acid containing anywhere from 22 per cent to 30 per cent Fe, that is, 28.3 per cent to 38.6 per cent FeO respectively, to give excellent results, the balance being CaO, ZnO, etc.

On several occasions I have endeavored to make a slag high in silica and alumina, in order to force the alumina to act as a base, and found that some of the silica would soon show on the surface of the slag-pots not fused, and the slag would scarcely run. At other times I have been able to make slags extremely low in silica, on account of its alumina contents. Classing alumina as an acid, I have successfully made slags extremely clean, containing over 20 per cent alumina.

Of course we cannot compare sulphide smelting in shallow furnaces, where both time and reducing agents are limited, with the deep iron furnaces, where they use so much fuel, causing a strong reducing action and an intense heat, especially with hot blast.

I do not think it advisable to attempt to make a slag containing more than 12 per cent zinc; that is, 15 per cent ZnO, and the FeO must be reduced in proportion. So that for practical running I would put the maximum amount of ZnO at 11 per cent, and the minimum amount of CaO at 10 per cent, assuming that there are no magnesia or alkaline bases present.

Of course, in matte smelting it is not practical or necessary to figure out, as we do in lead smelting, the exact combining power of the lime, magnesia, iron and zinc contents with the silica, and know what the slag will contain to within ½ per cent of the silica, iron, lime, before putting on the charge, as in sulphide smelting we have to depend on the feeder and proper oxidation of the furnace for all our iron, so that a little carelessness on the part of the feeder or an increased amount of fuel will produce more matte and decrease the iron in the slag.

6. *"What percentage of zinc in each charge would be treated profitably?"*

This question is answered in my reply to the last.

7. *"What is the degree of desulphurization obtainable?"*

This is a question I cannot answer definitely, for the reason that in making up a charge, the first thing to be considered is to use sufficient silica to combine with the bases, by adding enough lime or magnesia to make the slag of the proper specific gravity. My experience has been that by the time this is done the percentage of sulphur is so reduced that a person can concentrate anywhere from 8 to 12 tons of ore into one ton of matte, which is all that is advisable, and have a proper matte-fall for fast running and keeping the crucible hot. I have made much higher concentration than 12 to 1, but found it was not practical or successful, and for this reason I cannot answer definitely the question as to the degree of desulphurization obtainable, but I will say that I think a concentration of 12 tons of ore into one ton of matte in one operation, the maximum.

8. *"What are the possibilities as to the capacity of the furnace?"*

This, as in cold blast smelting, depends a great deal upon the character of the ore, matte-fall and percentage of copper in the charge. Plenty of copper and large matte-fall means faster running and less fuel consumption than a limited amount of copper and higher concentration, but I would say that the capacity of the furnace with hot blast, as compared with cold, would be fully one-third more.

9. *"What are the limitations of the process?"*

This is answered in the reply to No. 1.

10. *"What is the relative economy as compared to rival processes?"*

This is answered in the reply to No. 2.

S. E. BRETHERTON.

Val Verde, Arizona, Oct. 10, 1903.

MINING IN CHINA.

The Editor:

Sir.—I have read with considerable interest your timely article upon "Mining in China," and as I have been in that country over seven years, the last few of which I have devoted to studying geological conditions, prospecting, etc., I believe I am in a position to treat the subject with some little knowledge. The one point in your article to which I wish to call particular attention is where you state "Of China's mineral resources not much is known with precision." This is true, so far as it applies to data obtainable from books, to such sources of information as a writer or the casual seeker after data would turn to; but to those who are now interested, China is known to be rich in almost all the known minerals, especially gold, silver, copper, lead, zinc, antimony, coal and iron.

As far back as five years or more, far-sighted capitalists and mining men of Europe, recognizing that the opening of mines would follow as a natural sequence to the construction of railways and other improvements in China, formed preliminary syndicates, sent representatives and mining engineers to China for the purpose of exploring the country, and, if results should prove as anticipated, to obtain advantageous positions, in anticipation of the inevitable rush that must take place upon the opening up of the country. The information, or knowledge, this advance guard obtained was not for publication, but the result is in evidence by the many syndicates and companies formed in England, France, Germany, Belgium and Italy, for operations in China. To these the leading financiers and the investing public of the respective countries have subscribed millions in capital. The fact that all Europe is there should be sufficient to attract the attention of Americans, if only to investigate; especially when it is, or should be, recognized that, if there is any national preference, it is and will be for Americans. The concession, which was granted most reluctantly by the Chinese in the recent treaty revision, is the article which provided for the opening up of the country to mining. Chinese officials, while recognizing the time had arrived when the country should take advantage of her vast mineral resources, have, through the fear that a foothold granted to miners would be used as a pretext to seize territory, been almost a unit in opposing any advances made in this direction. Independent of the good-will and friendship due to the many favors rendered by the United States Government to the Chinese Government and the humane actions of the United States soldiers while upon Chinese territory, the most important consideration is the well-recognized opinion existing that the United States has no design upon any part of Chinese territory, and that a concession or permit to own and operate mines granted to Americans would only be used in a business way, whereby the welfare of the country would be benefited by royalties, increased custom dues, and work for the people. The lack of knowledge and interest—one might call it the apathy—of American capitalists and mining men as to this new field would be surprising were it not for their rooted objection to going beyond or outside of their own country or adjoining territory. There may be, however, other reasons than that of profitable investment, which may render it wise for existing interests to turn their attention to China. To-day the mines and refineries of the United States not only supply the wants of the country, but the surplus is shipped to all the great metal markets of the world. It is, however, predicted by well-informed persons that China may, in a few years, be in a position to ship enormous quantities of copper at less than half its present cost of production. This would seriously affect the value of copper properties and securities in this country. Americans may not want to go to China, but investigation may prove it to be a wise and necessary move to obtain control of mining interests there in order to protect existing interests in the United States.

China has some conditions essential for quick

and rapid progress, when mining is once fairly started. The mines will not be in wild, uninhabited regions, to which all supplies, even labor, must be carried with great difficulty and expense. China, independent of hundreds of miles of railways now in operation, in course of construction and provided for, is covered by a complete network of rivers and canals, with a system perfected by centuries of use. The question of transportation would probably never act as a bar to the workings of any property. Labor is to be had in unlimited quantities, good and steady, at rates per month less than are usually paid per day in other countries.

Coal of good quality is there in enormous quantities, with other requirements for mining and smelting, such as food supplies cheaper than in any other place, where mining is now conducted. Within five years the working of a few antimony mines in the province of Hunan was commenced under government control, and, were it not for this control, the offerings from China would swamp the market; as it is, prices of refined antimony have been forced down over one-third and Chinese antimony ores are offered of good quality and at low prices. The mines are worked by hand labor, with crude tools, and no machinery is used. The ores, as brought to the surface, are sorted by women and children, and are broken, where necessary, into small pieces, hand-culled and dressed. In this way the ore for export and for sale is practically pure. The rejected ores are smelted into crude antimony by a primitive method, with great waste. The method is by volatilization and the slags carry 25 to 30 per cent metal. Under these conditions, with over 1,000 miles inland transportation, Chinese are able to ship quantities of both ore and regulus, at a satisfactory profit. These conditions will probably apply to the working by hand-labor of many other minerals, especially if, under practical supervision of foreigners, modern tools and methods of mining are used. This would eliminate the risk of installing expensive machinery and plant until sufficient work had been done to determine sufficiently the extent and value of deposits.

With low ocean freight rates to Europe and to New York per ton, making possible the shipment of concentrates, matte and metals, the future mining possibilities in China are great. The question of a "commercial yellow peril" to existing interests may be raised; on the other hand there are opportunities for large profits.

FREDERICK W. SUTTERLE.

New York, Oct. 16, 1903.

REGENERATION OF CYANIDE.

Sir.—I have read with much interest Mr. Crosse's reply to my letter of June 5 on "Regeneration of Cyanide Solutions."

A careful perusal of my letter of June 6 will find answers to several of the arguments advanced by Mr. Crosse in his letter of August 9, and these he has in some way overlooked. I am pleased to see that Mr. Crosse admits the correctness of the equations on which my process is based, but I differ with him when he states that the reactions have long been known. That a zinc salt could be used in removing sulphide from soda and potash solutions in commerce has long been known, but that soluble sulphides could be used to remove zinc from its cyanide compound in a cyanide solution, *without leaving free sulphide in solution,* has not long been known, and it is entirely on this point—the obtaining of a solution free from soluble sulphides—that both Mr. Crosse's method and my own methods hinge.

Mr. Crosse gives my equations:

$$K_2ZnCy_4 + 4NaOH = 4NaCy + K_2ZnO_2 + 2H_2O.$$
$$Na_2ZnO_2 + Na_2S + 2H_2O = ZnS + 4NaOH,$$

and makes the following deductions from theory, as he is evidently not acquainted with the mode of procedure necessary to give successful economic results. He says in his letter of August 9: "The net result is that to regenerate 52 parts CN combined with 65 parts of zinc, we must add to the solution 160 parts caustic soda, and 78 parts of sodium sulphide. Such a process involves an enormous increase in the alkalinity of the solution and a corresponding increase in the consumption of zinc in the extractor boxes. On the point of cost alone I cannot see how it can pay to add 160 lb. of caustic soda and 78 lb. of sodium sulphide (anhydrous) to obtain 52 lb. of CN, equivalent to 130 lb. of potassium cyanide."

He overlooks the fact, or, to be more correct, draws the wrong conclusion from the fact, that an equivalent quantity of alkali (4NaOH) is regenerated by the Na_2S as was used to dissociate the K_2ZnCy_4, namely, 4NaOH, (see equation). The equation is progressive; it is only necessary to add sufficient alkali (generally from 1 to 2 lb., per ton of solution) to start the dissociation, and the addition of the sulphide precipitates its quota of zinc and regenerates an equivalent of the original amount of added alkali, which is available for further work. This reaction has its limitations, as stated in my letter of June 5, where I say: "I found that to obtain good precipitation of the zinc at the ordinary temperature with sodium sulphide, the double cyanide of zinc and potassium had first to be dissociated by the addition of a certain amount of alkali, when 60 to 75 per cent of the zinc contents could be precipitated without leaving free sulphide in solution; but to obtain complete precipitation of the zinc, heating of the solution had to be resorted to. . . . The cost of regeneration of sodium cyanide from double cyanide of zinc and sodium is from 3 to 5c. per lb. of cyanide regenerated, depending on the amount regenerated and the cost of chemicals at the different plants."

In using my process in regular mill practice for several years, I have not found, as Mr. Crosse deduces from theory (his letter of August 9), "that there is an enormous increase in the alkalinity of the solution, and a corresponding increase in the consumption of zinc in the extractor boxes." We do not find the alkali to increase in solution, nor the consumption of zinc to increase on using my methods. At the Chloride Point mill, in Utah, (50 tons per day cyanide mill, erected to treat silver ores), where my process was first used *on the mill scale,* five years ago, our consumption of zinc averaged 1.2 lb. per ton of ore, and with this we precipitated from 10 to 15 oz. of silver; ½ to 1 dwt. gold. The consumption of zinc there per ounce of metal precipitated was very much less than any I have ever seen recorded. The slimes from the zinc-boxes were simply screened through a 20-mesh screen, and with no other treatment but drying to drive off the moisture, assayed from 85 to 92 per cent fine metal (gold and silver). Very coarse zinc was used in the extractor boxes, and the gold and silver slimes could be shaken from same in an almost pure condition. Confirmatory results to the above, proving that there is no excessive consumption of zinc, or an excessive increase of the alakli, have been reported from the various other plants using my process.

Regarding the formation of sulphocyanide on heating a cyanide solution in presence of free Na_2S, as I stated in mine of June 5, and which Mr. Crosse in his reply discounts, I may state that my loss of cyanide by conversion into sulphocyanide varied from 5 to 11 per cent on heating the solution to 50° C. to obtain complete precipitation. The stronger the solution in free cyanide, the greater the loss due to formation of sulphocyanide (KCNS).

Next, as to my claim for priority for the regeneration of cyanide from zinc double cyanide, in the manner I have previously described:

My first work on these lines was conducted eleven years ago, when I was in the employ of the Cassel Gold Extracting Company, Glasgow, Scotland, and under the direction of John S. MacArthur, one of the inventors of the cyanide process, and the idea was his. We were unsuccessful in our efforts at that time because we were unable to obtain a complete reaction with the sulphide and zinc, and did not then devise a method of overcoming the difficulty—the same trouble Mr. Crosse encountered when he began experimenting on those lines five years ago, six years after I had trodden the same path. I continued the investigation in the United States whenever I obtained a suitable solution on my visits to the various plants, and, after repeated trials, made my first successful regeneration on a mill scale at Chloride Point mill, Utah, in the spring of 1898, previous to the time Mr. Crosse had even begun his experimenting with a similar object in view. I improved on my first practice considerably, and in December, 1900, applied for patent on such improvement, which was granted, and in August, 1901, took out the patent.

A very important point in this connection is that my method has actually been in regular mill practice for the last five years at various plants, and Mr. Crosse's, as far as I can learn from his letters, has yet to emerge from the experimental stage. Thus, my original contention holds good that the idea suggested by Mr. Crosse to recover cyanide from double zinc cyanide, in his article read before the Chemical Society of South Africa in March last, had been acted on, and a practical method devised and in daily us on a mill scale in this country, five years ago.

WILLIAM ORR.

Denver, Colo., Oct. 19, 1903.

FRENCH IRON TRADE.—For eight months ending August 31, the total imports of iron and steel into France were 112,694 metric tons, a decrease of 5,568 tons from the corresponding period in 1902. The exports of iron and steel in all forms were 351,892 metric tons, an increase of 37,789 tons over last year.

OVERLAND MAILS TO THE EAST.—According to the *Railroad Gazette,* the Siberian and Chinese Eastern railroads were opened for the transportation of the mails of all countries in the International Postal Union October 1 last. Heretofore they carried only the Russian mails to the Pacific. France, Germany and Belgium immediately directed their mails by that route to all places which can be reached quicker by it than by existing routes. For German mails these places are declared to be Japan, Korea and China as far south as the Yang-tse-Kiang. Canton, therefore, seems to be reached more quickly by the Suez Canal than by the railroad. Mails are not carried on the International Sleeping Car Company's special trains over the Siberian railroad, and by the ordinary trains the time is 17 days from Moscow to Dalni. The Russian steamers from Dalni to Japan and to Chinese ports sail only once or twice a week. The time of the mail on the road thus varies. From Berlin to Pekin it is 20 to 22 days; to Shanghai, 22 to 28; to Nagasaki, Japan, 23 to 29. By steamer and the Suez Canal the usual time is: Pekin, 40 days; Shanghai, 33; Nagasaki, 36.

THE LEAD CONSOLIDATIONS.—The mines taken over by the Federal Mining and Smelting Company in the Cœur d'Alene district included the Tiger, Poorman and Ella at Burke (formerly the property of the Empire State-Idaho Company), the Last Chance group, the Standard, the Mammoth, and an interest in the Skookum; also the smelter at Everett, Washington. The Bunker Hill and Sullivan, Morning and Hercules properties remained independent, but lately it has been rumored that control of them has been secured by the American Smelting & Refining Company. The United Lead Company took over the property of the Union Lead & Oil Company, but did not include the Federal Lead Company, although the latter will work in harmony with it. Also, the Picher Lead Company of Joplin, Mo., has not yet gone into the United, but may do so. Gossip is that the National Lead Company and the United Lead Company are not on such friendly terms as it was supposed they might be. The National is intending to build a new smelter near East St. Louis, on which work will probably be begun very soon.

THE CRETACEOUS AURIFEROUS CONGLOMERATE OF THE COTTONWOOD MINING DISTRICT, SISKIYOU COUNTY, CALIFORNIA.*

BY H. W. TURNER.

The formations of southern Oregon and northern California may be divided into two sharply contrasted series, an older metamorphic and a younger unaltered.

The Metamorphic Series (Auriferous Slates and Associated Rocks).—The older series is composed of slate, quartzite and metamorphic lavas or greenstones, and into these are intruded a great variety of igneous rocks, such as granite, diorite, serpentine, etc. This group therefore comprises rocks of very diverse origin, composition and texture, but excepting the intrusive rocks, they all have undergone metamorphism. These rocks were all formed before the middle of Cretaceous time and constitute the country rocks of the gold veins of the area under discussion.

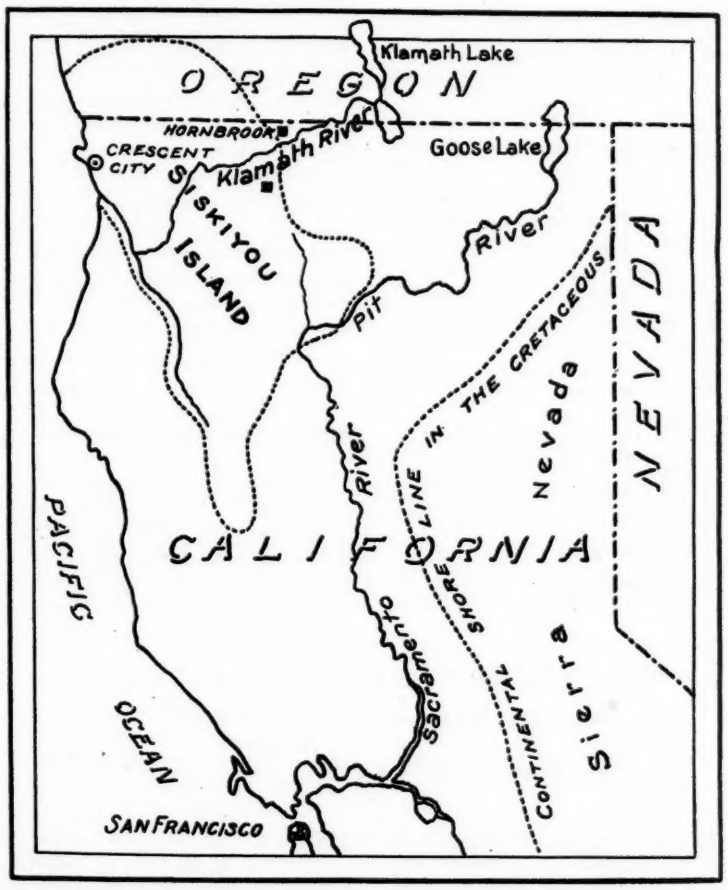
After the formation of the auriferous slates and associated greenstones there came a period of great upheaval at, or soon after, the close of the Jurassic period. Accompanying this uplift were intrusions of various granitic and allied rocks.

As a result of this uplift the Sierra Nevada was first formed as a great mountain range, and the mountains of northwestern California and southwestern Oregon were likewise uplifted, forming a landmass which was first described by Prof. J. S. Diller of the United States Geological Survey. Recently Prof. Condon of the University of Oregon has designated this land-mass Siskiyou Island, for in Cretaceous time it was surrounded by the sea. It embraces the Siskiyou, Salmon, Scott and Trinity mountains; and to this group Diller has given the name Klamath mountains.

The Younger Unaltered Series.—The second series differs from the first in not having undergone metamorphism and in the absence of deep-seated granular igneous rocks, such as granite and diorite. They also differ in age, being of later date. This entire unaltered series was formed after the uplift of the Sierras, and Siskiyou Island; that is to say, after the Jurassic.

The unaltered series consists of conglomerates, sandstones and shales, and a great variety of volcanic rocks. In point of geological time these rocks belong to the late Cretaceous and Tertiary periods. When in contact with the older auriferous slate series, these later sandstones, slates and lavas are seen to rest on the former with a marked unconformity.

The approximate position and outline of Siskiyou Island and the Sierra Nevada land-masses in Cretaceous time are shown on the accompanying map (adapted from Diller). On the border of Siskiyou Island we may trace the old beach-lines by the conglomerates and sandstones containing Cretaceous seashells, and we find such rocks up to, and above, an altitude of 3,000 ft. from the present sea level. At least this is true of the Cretaceous shore in the neighborhood of Yreka and Hornbrook in Siskiyou county. This shows clearly an elevation of this region of 3,000 ft. since the Cretaceous period.



Map showing the Shore Line of SISKIYOU ISLAND and the CONTINENT in CRETACEOUS TIME.

Going further south, we find remnants of late Cretaceous sandstones and conglomerates marking the continental beach-line of that period at an altitude of about 3,000 ft. west of Lassen butte. From there south the elevation of this beach gradually decreases, until, in the neighborhood of Folsom on the American river, it disappears under the later sediments of the San Joaquin valley.

The Period of the Formation of Gold-Quartz Veins.—It is universally recognized that the gold found in the metamorphosed conglomerates and gravels came originally from vein deposits. The metalliferous veins of the area under discussion are confined almost entirely to the older metamorphic series and associated intrusive rocks.

Wherever, then, the beach deposits of the Cretaceous abut against older rocks containing gold veins, they will contain more or less gold, the amount usually depending directly on the richness of the adjoining veins. It follows from this that the old beach-gravels will sometimes be rich and sometimes contain nothing. It is therefore to be expected that the old Cretaceous beach-gravels of Siskiyou Island will contain gold in commercial quantity at but few points. But it should be borne in mind that these gravels have undergone erosion ever since their uplift and have largely been worn away, their contents enriching placers of later age. So far as known, the Cottonwood mining district is the only place in California where these deposits have been mined.

The Basal, Auriferous Conglomerate.—The basal conglomerate of the Cretaceous beds in the Cottonwood mining district has been called a river deposit, but a glance at the sections shows this to be an error. The conglomerate is clearly a part of the sandstone series, and is, indeed, replaced by sandstone at some points. If a stream existed here in pre-Cretaceous time before the sandstone was deposited, there must have been two banks, both of them composed of the older metamorphic series; in other words, there must have been an east and west rim. While there is a distinct west rim, at no point is an east rim to be made out. It may be said that at the time when the conglomerate was formed the surface of the bed-rock was more nearly horizontal than at present, and that by the uplift of Cottonwood peak ridge to the west, the inclination of the bed-rock was changed so that it now dips easterly at a greater angle than formerly. In this case the east rim would be depressed, but it could not have been obliterated. Rivers do not run parallel to the edge of a mountain mass when lower land is adjacent. They occupy the lowest portions of valleys, and while it is probably true that the inclination of the bed-rock (composed of the auriferous slate series) was increased at the time of the uplift, there would still be the higher land of the east banks of the hypothetical stream to account for. Now the general slope of the bed-rock from the west rim or present outcrop of the conglomerate is to the east for several miles, as shown in the section across Cottonseed valley. The lower of the three sections represents approximately the outline of the surface at the time the conglomerate was formed. We may suppose the basal conglomerate to have been formed before the advent of the sea, but it is clear that any river that may have existed would have occupied the valley at A, and not at C, where the conglomerate actually occurs.

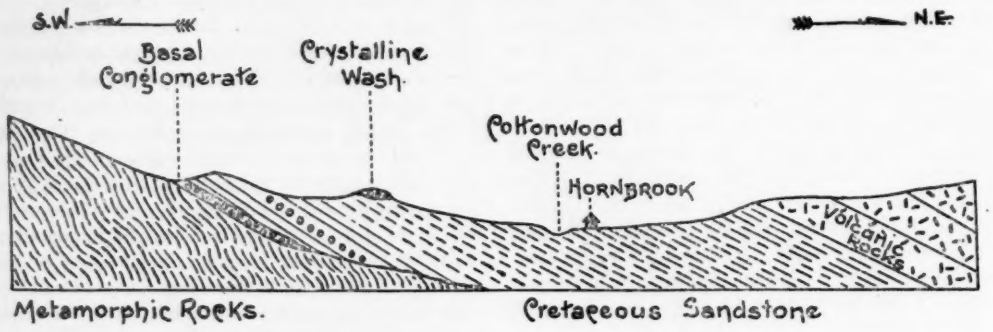
Moreover, the basal conglomerate contains layers of sandstone precisely like the sandstone overlying, and there are other layers of conglomerate imbedded in this sandstone at higher horizons.

These facts, together with the occurrence of seashells in the sandstone, close to the top of the conglomerate, appears to dispose of the river-channel theory effectually. Other evidence pointing in the same direction is to be found in the character of the pebbles. In a river the gravel and boulders gradually travel down stream, or away from their source, while with the ocean, although shifted about by the waves, currents and tides, they are usually not carried far from their source. Now, at the Jillson Blue Gravel mine, where the bed-rock is best exposed, the bed-rock is largely greenstone and the pebbles are also largely greenstone; farther north, as in the Rancheria creek, there are pebbles of quite a variety of rocks, greenstone, quartz, quartzite, chert, porphyry, diorite and granite, while the bed-rock is chiefly of the slate series, containing, however, dikes of greenstone and of porphyry, etc.

The rarity of slate pebbles is largely due to the fact that the softer slate does not readily form pebbles, while the dike rocks cutting the slate being harder, together with the chert and quartzite layers in the auriferous slates, are here the chief source of the pebbles. The granite pebbles in Rancheria creek undoubtedly came from the granite area of the north end of Cottonwood Peak ridge, and many such pebbles may have been brought down to the sea by the streams that flowed into it from Cottonwood Peak ridge. All the evidence goes to show that the conglomerate is a part of the Cretaceous marine deposit. There appears to be no good evidence that any of it

*Published by permission of Mr. R. M. Brereton.

was formed by a river, and so much space would not be given to the elucidation of this point were it noted that an engineer has stoutly maintained in print[1] that the conglomerate here under discussion represents an old river deposit.



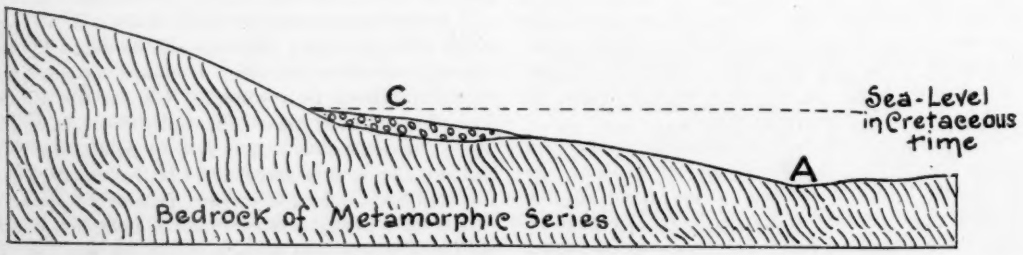
GEOLOGICAL SECTION ACROSS COTTONWOOD VALLEY showing the relation of the auriferous basal conglomerate to the other formations.
Horizontal Scale: 1 mile = 1 inch - and - Vertical Scale: Somewhat exaggerated.

The Thickness and Extent of the Basal Auriferous Conglomerate.—The basal auriferous conglomerate was examined only from the Klamath river north to Bushy gulch, a horizontal distance of about four miles.

At the Jillson Blue Gravel mine, just north of the Klamath river, the conglomerate has a maximum thickness of about 75 ft., gradually wedging out to the east as shown in the section copied from the report of R. L. Dunn. A little farther north, in the vicinity of Jillson's old house, the sandstone may be seen in place within a few feet of the underlying bed-rock, suggesting that here the sandstone overlaps the bed-rock and that the bottom of the basal conglomerate is absent.

Still farther north, at Babcock gulch, we again find the basal conglomerate, and its outcrop may be continuously traced from here northward to the ridge north of Ditch creek, where the sandstone overlaps the bed-rock, apparently cutting out the basal conglomerate. The same sandstone may be seen in place within a few feet of the bed-rock in the bottom of Bushy gulch. While, therefore, there may be conglomerate under the sandstone in depressions in the bed-rock to the east of the shore-line, as, for example, at the bore-hole, 160 ft. deep, drilled in Bushy gulch, for all practical purposes the basal conglomerate of the old beach-line may be said to end in Ditch creek ravine.

except that going northward from Ditch creek it appears to thin out until, as before stated, the sandstone overlaps the bed-rock on the top of the ridge north of Ditch creek. This sandstone overlapping the bed-rock is not the sandstone capping the conglomerate, but rather a replacement of the gravel by sand in the lower part of the conglomerate bed, so that the main reef may be said to extend farther north. However, inasmuch as the workable portion of this gravel bed comprises only a few feet of material next to the bed-rock, for mining purposes we may still say that the basal conglomerate practically ends in Ditch creek ravine. Further tests may, however, prove the existence of auriferous layers in higher portions of the reef.



HYPOTHETICAL SECTION - showing the relation of the sea to the Basal Conglomerate in Cretaceous time.

In Rancheria creek, at the Black Jack mine, the conglomerate has a thickness of about 170 ft., and may be followed from the top of the spurs north and south of the creek to the bed of the creek, a distance on the dip (25°) of about 1,000 ft.

The thickness of the gravel and its extent appears to be as great in Ditch creek as in Rancheria creek,

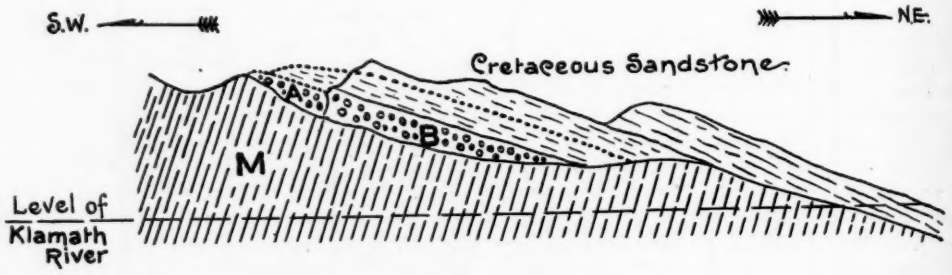
[1]*Twelfth Report* of the State Mineralogist of California, pp. 459-471.

Extent of the Conglomerate Downward.—We have seen that the basal conglomerate appears to wedge out on its downward dip to the east in the Klamath river section; but where cut through by Rocky gulch, Rancheria creek and Ditch creek we only know that the conglomerate dips down under the creeks to the east. No absolute knowledge as to its extent underground in these ravines is therefore available, but inasmuch as conglomerate beds usually do not end abruptly, but wedge out or are gradually replaced by sand, it is reasonably to be inferred that the cement gravel or basal conglomerate of Rocky gulch, Rancheria creek and Ditch creek will be found to extend downward to the east on the dip some hundreds of feet, affording good ground for exploitation by sinking incline shafts on the bed-rock, provided tests show the gold contents of the beds to be sufficiently high to make it probable that the mining of the basal conglomerate in general will be remunerative.

The Distribution of the Gold in the Conglomerate.—As already pointed out, on a basis of the local origin of the gold, we would expect to find the conglomerate richest in the neighborhood of the richest quartz veins. There are quartz mines, or rather prospects, in the metamorphic series all along the outcrop of the basal conglomerate from near the Klamath river to Rancheria creek, but so far as known, only two of these mines have been good paying properties. These are the Jillson and Mattern mines in Rocky gulch. Nevertheless the basal conglomerate appears to have been but little exploited in Rocky gulch.

It is a well-known fact, however, that many gulches have been rich in placer gold, and yet have not afforded workable quartz-veins. In such cases the placers have usually been fed by numerous small but rich stringers and pockets.

The Amount of Gold in the Gravel.—The Jillson Blue Gravel mine is situated just north of the Klamath river. On this property the conglomerate along its outcrop was sufficiently disintegrated to be treated by hydraulic methods. Later a 10-stamp mill



KLAMATH SECTION after R. L. DUNN.
A. Basal Conglomerate washed away.
B. " " in place.
M. Metamorphic Rocks.

was erected for the purpose of crushing the conglomerate. This appears not to have been a commercial success. Some of the conglomerate was treated in an arrastra, returning, it is said, about $3.50 per ton in gold. Probably the cobbles which form at least one-half of the deposit were rejected before treatment of the material. Powder was used to break up the conglomerate. About $20,000 is said to have been taken from the Jillson mine.

The conglomerate was also exploited by tunnels and an incline shaft on Rancheria creek, and about 100 tons is said to have returned $2.75 per ton treated in a stamp-mill.

The later placers of Cottonwood valley, composed of gravels of Pleistocene age, are estimated to have yielded about $4,000,000, and it is reasonable to suppose that a considerable fraction of this came from the Cretaceous conglomerate, since these gravels rest at most points on Cretaceous sandstone, which contains little, if any, gold.

PETROLEUM IN ROUMANIA IN 1902.—During the fiscal year ending March 31, 1903, the quantity of crude petroleum refined in Roumania was 236,459 metric tons, or nearly the entire production of the country. The refined products, which include benzine, kerosene, lubricating oils and residuum, amounted to 223,139 tons. The principal refineries are situated in the departments of Covurliu, Dombovitza, Ilfov, Buzeu, Putna and Bacau.

UNIFORM COST RETURNS.*

By W. A. PRICHARD.

All good work in mining is the result of an honest desire on the part of a director, engineer or manager to meet surrounding conditions and make the greatest possible profit out of a mining property.

A mining property, unlike a manufacturing concern, is an exhaustible asset. Every pound unnecessarily expended in development, machinery or working costs on a mine is irretrievably lost to the mining investor. In order to avoid such wasteful expenditure it is necessary to determine with as much precision as possible what is the best machinery for a given purpose, what are the best working methods to employ, and what is the best type of man to place in charge of such machinery and operations. The great multiplicity of machinery and methods employed in mining operations makes such determinations extremely difficult on account of the large number of ingenious men engaged in mining, each with his individual proficiency in certain branches of work. Aggregate working costs differ widely in mines working on similar ores under similar conditions. Comparative analysis of the working costs shows up still wider differences in the cost of certain operations, such as crushing with stamps, concentrating, amalgamating, etc., a perfect understanding of which should be the very A B C of a mining man's education.

Where several mines with similar ores, such as at Kalgoorlie, are working under the same general conditions of labor, supplies, etc., the officials of each individual mine should be afforded every facility for profiting by the mistakes and successes of all others in the district. By systematizing the records of engineering, metallurgical and mining results under a common system, great economy can be introduced in the experiments, methods of working, and selection of supplies and machinery. Every mine has its own system of account-keeping and reporting to conform with the different ideas and methods of different auditors and managing directors, and although the cost sheets of each mine fulfill all of the requirements of that particular mine, the varying conditions and different processes and methods employed make comparison extremely inconclusive. In order to show up the advantages and defects of different machinery and methods, it is necessary to compute the cost on a common system for comparison. The writer has, to meet this requirement, designed a special cost form. This cost form has, since the beginning of the present year, been used as an auxiliary to the regular cost and extraction sheets at the Lake View Consols, Great Boulder Main Reef, Oroya Brownhill, and Great Fingall mines.

Although the above mentioned mines are employing different machinery and three widely different treatment processes, the costs have been split up in such a way that the various detail operations at one mine are set against similar operations at the others in such a way that any one who is interested enough to inform himself as to the character of ore treated, extractions obtained and machinery employed, can derive very accurate information as to the relative advantages of the machinery, methods and processes.

Such comparisons as these introduce a healthful rivalry among managers and afford great assistance to themselves in their efforts to introduce the most economical machinery and the most skillful employees.

The accompanying reproduction of the expenditure-accounts for the operations of three mines by the three processes used exclusively in Western Australian gold mines illustrates the use of the form referred to above.

(Owing to the exigencies of space, we are unable to reproduce the tabulated statement referred to, but an idea can be obtained by giving the list of headings and sub-headings, which are as follows:

Rock-breaking—
Power, Labor, Repair, Supplies, Drying Wet Ore;
Transport to Mill—
Power, Labor, Repairs, Supplies;
Milling—
Power, Labor, Repairs, Supplies (General), Mercury;
Concentrating—
Power, Labor, Repairs, Supplies;
Roasting—
Power, Labor, Repairs, Supplies (General), Fuel;
Grinding (Mills or Pan)—
Power, Labor, Repairs, Supplies (General), Mercury;
Classifying, Elevating, and Returning Solution—
Power, Labor, Repairs, Supplies;
Agitation and Cyaniding—
Power, Labor, Repairs, Supplies (General), Cyanide, Cyanogen Bromide, Acid, Lime;
Filling, Drying and Emptying Presses—
Power, Labor, Repairs, Supplies;
Disposal of Residues—
Power, Labor, Repairs, Supplies;
Precipitation and Smelting—
Power, Labor, Repairs, Supplies;
Proportion of Assaying and Sampling—
Power, Labor and Salaries, Repairs, Supplies;
Total Treatment Costs—
Summary—
Power, Labor and Salaries, Repairs, Supplies;
Management and General Expenses—
Stoping—
Power, Pumping, Labor and Salaries, Repairs, Supplies, Proportion of Assaying and Sampling;
Total Working Costs—
Mine Development—
Power, Labor and Salaries, Repairs, Supplies, Proportion of Assaying and Sampling;
Plant—
Labor and Salaries, Supplies and Sundries;
Grand Totals—
Additional Expenditure—
Treatment of Old Sands, Treatment of Old Slimes.)

Comparison is therein made of the wet crushing, concentrating, bromo-cyanide process of the Oroya Brownhill; the dry crushing, roasting cyanide process of the Great Boulder Main Reef; and the wet crushing, concentrating cyaniding process of the Great Fingall Consolidated, together with their mining and other expenditures for the month of July, 1903.

At the recent conference of the Chamber of Mines at Kalgoorlie, a resolution was passed favoring the adoption of a uniform system of reporting costs. The above information is offered as a possible aid toward that end. The present practice of a few mines in Western Australia of publishing costs monthly has been a wonderful impetus toward improvement in mining and the advancement of a professional engineering spirit among the mining men of the district.

Uniformity of account-keeping is much needed in the matter of separating development from ore extraction and in charging out salaries and management expenses. The writer has instituted at a few mines the system of charging to ore extraction all ore derived from development at the average stoping cost for ore derived from stopes.

*From the monthly report of the Chamber of Mines of Western Australia for August, 1903. Published at Kalgoorlie.

PERMANENCE IN DEPTH IN KALGOORLIE.*

By H. C. HOOVER.

The mines of Western Australia divide themselves geologically into the mines at Kalgoorlie and the mines outside, the Kalgoorlie mines having no precise parallel in any of the outside districts. As to the outside mines—five in number—they are nearly all fissure quartz veins with definite ore shoots. One—the Fingall—has steadily and greatly improved with depth; the others have, after passing the surface zone, fairly held their own.

Of these sixteen, eleven are at Kalgoorlie, representing about 75 per cent in value and output. The detailed character of the deposits at Kalgoorlie is subject to much division of opinion, but, from a miner's standpoint, they are best described as impregnations and replacements along zones of shearing in the country rock. These zones of shearing probably follow ancient dikes. The country rock is of very ancient origin, and composed of highly altered acid-igneous rocks (and, it is claimed, some sedimentary rocks).

The zones or "lodes," to use the popular term, vary from 10 to 150 ft. wide, and have been worked in several instances almost continuously for over a mile. They were probably originally a basic dike, possess a schistose appearance, and carry minor quantities of gold throughout. The lodes certainly arise from profound dynamic movements, and in no case do the geologic conditions of the district indicate any probable structural change in depth. I believe all engineers and geologists who have studied the deposits agree that the only admissible theory of origin of the ore is by deposition from solutions ascending from profound depths. Along these zones, in a broad way, the payable ore occurs in the shape of lenticular bodies within the lodes. These ore-bodies are found more regularly and frequently in some mines than others, in such cases as the Ivanhoe and Horseshoe making practically continuous ore, and having the general character of ore-shoots rather than ore-bodies. In other mines these ore-bodies are more disconnected, and, in the extreme case of the Oroya Brownhill, follow on a sort of chain, in such a way as to give the appearance of a narrow pipe of ore, which chain has now been traced for some 3,300 ft. along its major axis. In some instances, such as the Lake View, the ore-bodies have not been as close together as could be desired, showing in this mine an area barren from a profit standpoint (though containing minor rich ore-bodies) for 400 ft. of depth, from the 600-ft. to the 1,000-ft. levels, yet the ore-bodies re-occur at the 1,000-ft. and further improve at the 1,200-ft. levels.

That laches in values may occur in individual mines is already demonstrated, but it is equally demonstrated that the corresponding improvement in other mines, in a broad way, equalizes matters, so that the district, considered as one mine, is keeping a fairly uniform average of ore per foot of depth. Instances of this change in the state of individual mines are to be seen in the Brownhill, the continuation of whose ore-bodies was found in the Northern Blocks and the Oroya; also in the Lake View, Great Boulder Main Reef and Great Boulder mines, which have passed through the difficulties of bottoming known ore-bodies, but in depth again found more. On the other hand, there are several properties which have discovered ore-bodies in depth where none, or but small ones, existed at the surface, such as the Northern Blocks, Oroya North Block, Ivanhoe South Extended at 1,400 ft., Boulder No. 1 North, and Central and West Boulder at 1,500 ft., Lake View (on the Perseverance lode) at 800 to 1,000 ft.

As has already been shown, the mines on an average have only been exhausted to a depth of 425 ft., and it is undoubted that to the depth of average development (826 ft.), if we omit the oxidized ore, there has been no diminution in volume or value, taking the district as a whole, and in reality probably an increase in quantity of ore. Below even the horizon of 826 ft., developments prove equal, if not superior, values. In the Great Boulder, drives at 1,600 ft., and the diamond drill at 1,750 ft., have proved the values to be maintained. In the Lake View, after 400 ft. of practically barren ground, ore was again encountered at 1,000 ft., and of still much improved character at 1,200 and 1,400-ft. levels. In the Ivanhoe, which was estimated to 700 ft., the developments at 1,000 ft. are likewise uniformly satisfactory. In general, the developments in different mines below the aggregate depth to which tonnage has been on an average exhausted, show that for 1,100 to 1,700 ft. from the surface, the value and volume of the ore is maintained to a degree fully equal to the sulphide region above this horizon. Within this depth there is a further four years' ore, beyond actual present ore reserves.

Taking into consideration the general structural features, the extensive width and continuity of the lodes, their undoubted origin from profound and far-reaching earth movements, there can be no doubt as to their continuity in depth. That ore will occur continuously with the lodes is a matter which permits of less finality. There can be no doubt as to re-occurrence to a further depth equal to two to three times as much as has already been exhausted. The great improbability from the general structure of the region of any alteration in the conditions which have brought about deposition at the horizons now exploited, argues strongly for continuity indefinitely below. In the minds of the author and his associates in daily professional work at the mines, there is felt great confidence in the permanence of the Kalgoorlie deposits in depth.

*Abstract from paper entitled "The Future Gold Production of Western Australia," by Herbert C. Hoover. *Proceedings* of the Institution of Mining and Metallurgy, London.

HYDRAULIC MINING ON THE QUESNELLE

By Wm. M. Brewer.

The Quesnelle division of the Cariboo mining district in British Columbia embraces all of the southern portion of that district, and includes within its boundaries the watersheds of the main Quesnelle river, together with all its tributaries, including the Horsefly river, which flows into Quesnelle lake from the southeast.

This portion of the Cariboo district lies to the south of the Cariboo mountains proper, and is not itself mountainous, being made up of extensive valleys and plateaux of pre-glacial periods. The elevation above sea-level ranges from 2,000 to 4,000 ft. The modern streams, for the most part, flow between high ridges, which are sometimes composed of the country rock, but very often of high banks of gravel and boulder-clay belonging to ancient channels which the modern streams have cut through. It is not seldom that the high banks of the rivers are composed of sand, usually capped with a thin stratum of gold-bearing gravel. These beds of sand have apparently been deposited since the modern streams have followed their present courses.

While this portion of the Cariboo country was first prospected for placer gold in 1858, when many of its gulches and bars yielded rich pay during the early days, yet in some places Chinamen are to-day earning fair wages by sluicing and rocking; however, it must be conceded that the shallow diggings are practically worked out, and that the time has passed when it can be considered a poor man's country.

The chief feature of this region is the extensive system of ancient river-channels, with their deposits of auriferous gravel and boulder-clay, which often reach a total thickness of 400 to 600 ft. between the present surface and bed-rock. This boulder-clay is of variable thickness, lying between strata of gravel; it is classified by Mr. J. B. Hobson, manager of the Consolidated Cariboo Hydraulic Mining Company, as volcanic mud, and as identically the same material as occurs in the hydraulic mining districts of California. Mr. Hobson was one of the first to recognize the opportunities presented for extensive hydraulic mining operations because of the occurrence of this system of ancient river-channels. He has devoted a great deal of time, and made strenuous efforts to trace the channels, and during the writer's recent visit into the country extended valuable assistance to enable the writer to make a thorough examination of this portion of the province, and especially of the properties under his own management.

The rock-formations embrace shales, conglomerates, dikes of plutonic rocks, and basalts. The schists classified by the late Dr. Dawson as Cariboo schists, which predominate through the northern portion or mountainous section of the Cariboo country, are not encountered in what may be termed the Quesnelle portion proper. These schists occur *in situ* on Spanish creek, a tributary of the north fork of the Quesnelle river, which forms its confluence with the north fork, about 16 miles east from the mining camp at Quesnelle Forks. The line of strike of these schists is northwesterly and near the mouth of Spanish creek parallels the channel of the north fork. The line of demarcation between this rock formation and the formations in the Quesnelle district proper is very clearly defined. The schists resemble, in a very marked degree, those which occur in the Appalachian mountains, in the gold-bearing districts of Georgia and Alabama. The same characteristics are noticeable in each locality, especially as regards the occurrence of garnets.

The only active operations in hydraulic mining on the Quesnelle river, which have been carried on during the past year, have been those on the Consolidated Cariboo Hydraulic Mining Company's properties, which comprise a series of leases located along an ancient river-channel or possibly two channels which have been traced for a distance of eight miles, and extend from Dancing Bill gulch to the mouth of Morehead creek, a tributary of the main Quesnelle river.

It would appear, from an examination of the country traversed by this channel, that the modern stream, which is the south fork of the Quesnelle river, apparently does not cross the ancient channel at any point between the outlet of Quesnelle lake and the forks, but flows parallel; there is evidence that the bed of the present river occupies the same position as did the ancient channel, but the present channel has been eroded about 70 ft. deeper than the bed of the ancient channel. Except at the outlets of Black Jack and Dancing Bill gulches, the present channel of the river is inclosed between precipitous ridges of conglomerates and shales which in places are metamorphosed; these are traversed by several dikes, especially in the vicinity of the outlet from Dancing Bill gulch. The bed-rock of the ancient river-channel is composed of augite diorite, with lenticular intrusions of a pink feldspathic rock, apparently belonging to a more recent period than the diorite. Apparently this same bed-rock extends nearly the entire length of the ancient channel, but is overlaid by shales, conglomerates and sandstones, forming the rim-rock and making high ridges, which enable one easily to trace the ancient river-bed along the valleys occupied by Long and Little lakes.

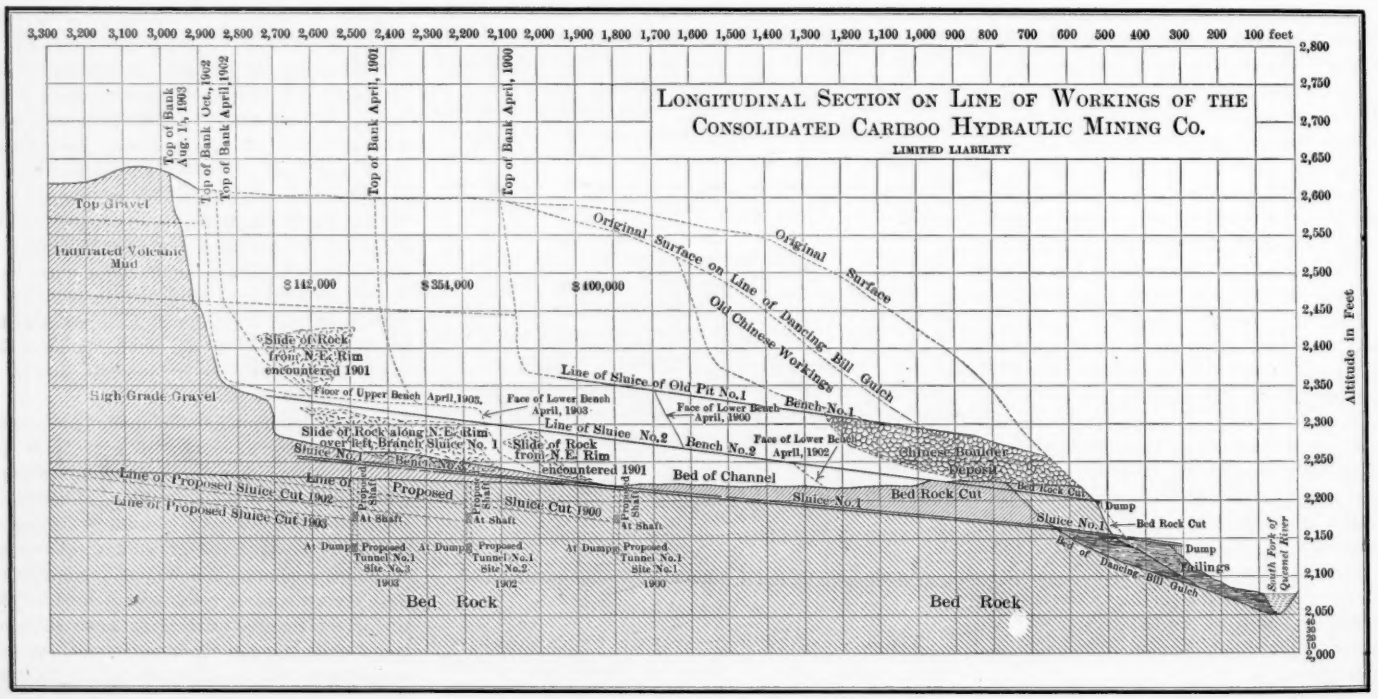
There is a peculiar feature noticeable with regard to the course of these ancient channels, which is that, apparently, at the outlet of Dancing Bill gulch, where the width is comparatively very narrow, one channel appears to have been dammed up and forced backward toward Black Jack gulch, where it formed a junction with the other channel and thence followed the depression shown to-day along the valleys of the Long and Little lakes.

The courses of other ancient channels can be traced on the north side of the Quesnelle river, and also between the forks of that river from Spanish creek westerly, but as no hydraulic mining has ever been done on any extensive scale on any of the channels, except at Dancing Bill gulch and immediate vicinity, the writer will, in the present article, confine himself to a description of that work which has been carried on by the Consolidated Cariboo Hydraulic Mining Company.

Although no hydraulic mining has been done elsewhere, there has been in years gone-by a vast amount of shallow placer mining carried on. The principal gulches, which were placer-mined by sluicing and rocking, in early days, are those which empty into the south fork of the Quesnelle river, between the lake and the Forks. Indeed the yield of placer gold from the west end of the Quesnelle lake, along the south fork to the Forks, a distance of seven miles, was so great, that a company located leases along the present river-bed, and constructed a dam at the west end of the lake, at a cost said to be about $500,000, with the intention of draining the river, and mining it by means of a bed-rock flume; but after the dam was built, prospecting disclosed the fact that the old-timers had, by means of wing-dams, worked out the bed of the river so thoroughly that the company abandoned further operations, and sold out the dam, together with all their rights, for a nominal sum to the Consolidated Cariboo Hydraulic Mining Company.

The management of this company has had to contend with great difficulties in securing a water-supply sufficient to work the ground, and even after the construction of the necessary dams, and upward of 30 miles of ditches and flumes, there was, during the present year, only sufficient water to carry on operations with one 8-in. giant for a period of 53 days.

The lack of water has been the greatest difficulty in this portion of the Cariboo country, the supply being furnished principally by precipitation and not


LONGITUDINAL SECTION ON LINE OF WORKINGS OF THE CONSOLIDATED CARIBOO HYDRAULIC MINING CO.
LIMITED LIABILITY
Top Gravel
Indurated Volcanic Mud
High Grade Gravel
Bed Rock
Bed Rock
Bed of Channel
Original Surface
Original Surface on Line of Dancing Bill Gulch
Old Chinese Workings
Chinese Boulder Deposit
Dump Tailings
Bed of Dancing Bill Gulch
South Fork of Quesnel River
Top of Bank Aug. 1, 1903
Top of Bank Oct., 1902
Top of Bank April, 1902
Top of Bank April, 1901
Top of Bank April, 1900
$ 142,000
$ 354,000
$ 400,000
Slide of Rock from N.E. Rim encountered 1901
Floor of Upper Bench April 1903
Face of Lower Bench April, 1903
Face of Lower Bench April, 1900
Face of Lower Bench April, 1902
Line of Sluice of Old Pit No. 1
Bench No. 1
Line of Sluice No. 2
Bench No. 2
Slide of Rock along N.E. Rim over left Branch Sluice No. 1
Slide of Rock from N.E. Rim encountered 1901
Sluice No. 1
Bench No. 3
Line of Proposed Sluice Cut 1902
Line of Proposed Sluice Cut 1903
Line of Proposed Sluice Cut 1900
Sluice No. 1
Bed Rock Cut
Bed Rock Cut
Dump
Proposed Shaft At Shaft
At Dump
Proposed Tunnel No. 1 Site No. 3 1903
Proposed Tunnel No. 1 Site No. 2 1902
Proposed Tunnel No. 1 Site No. 1 1900
3,300 3,200 3,100 3,000 2,900 2,800 2,700 2,600 2,500 2,400 2,300 2,200 2,100 2,000 1,900 1,800 1,700 1,600 1,500 1,400 1,300 1,200 1,100 1,000 900 800 700 600 500 400 300 200 100 feet
2,800 2,750 2,700 2,650 2,600 2,550 2,500 2,450 2,400 2,350 2,300 2,250 2,200 2,150 2,100 2,050 2,000
Altitude in Feet

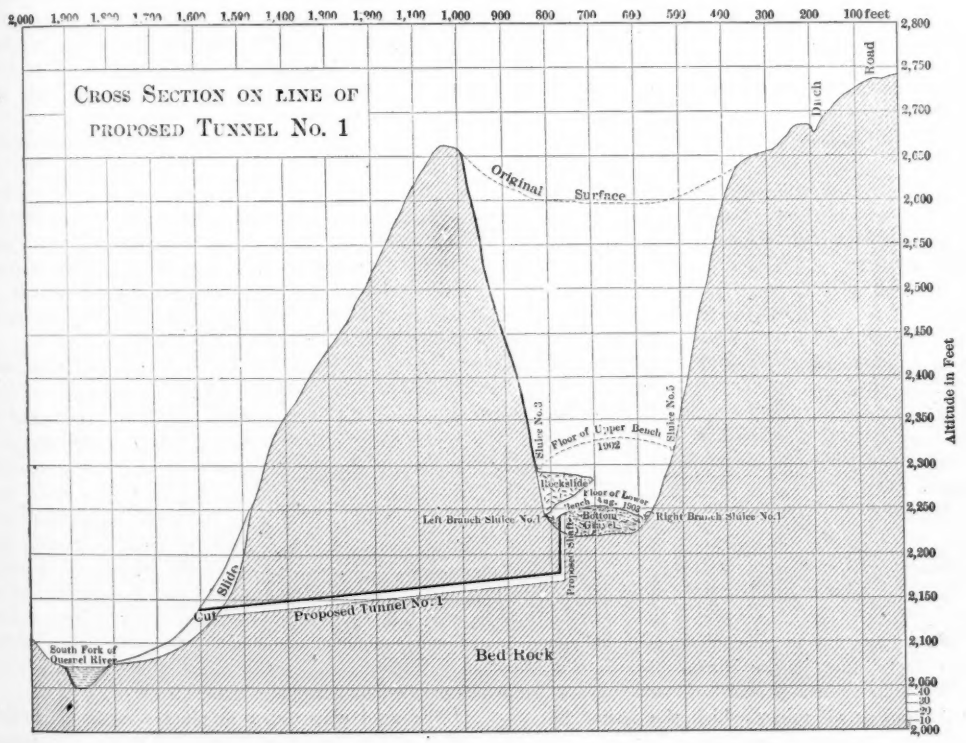
from running streams. The canals already constructed are able to deliver at the mine 5,000 miner's inches of water under a head of 420 ft. The sources of supply are at Bootjack and Polley's lakes, about 19 miles distant, and Morehead lake, 10 miles distant from the company's mines. These lakes have been converted into storage reservoirs by the construction of substantial dams across their outlets, and now have an aggregate capacity for storing 1,016,000,000 cu. ft. of water, which is equal to 475,370 miner's inches.

The accompanying longitudinal section on the line of workings shows how extensively this ancient river-channel has been worked from the outlet of Dancing Bill gulch. The yield of placer gold from the different lines of sluice is also shown, except from the work done during the past season, which was approximately $46,000. The yield of placer gold from the old Chinese workings is not given on the plan, because the value could only be roughly estimated at $900,000.

It will be seen from the diagram that the channel has been worked by benches, and at the time of the writer's visit the face of the cut was 350 ft. deep, showing erosions in the rim-rock. The coarsest gravel in the channel invariably carries the highest pay. The blue volcanic mud, which occurs under the top gravel, does not carry any values, except where it is mixed with gravel.

On the surface, and following the ancient channel toward the southeast, the depression between the rim-rock widens out, and in places reaches a total width of about 2,000 ft. from rim-rock to rim-rock; this is especially noticeable at the point known as the South Fork pit. At that point the ancient river channel has also been attacked, but no regular hydraulic operations have been carried on since 1899.

It is from this portion of the channel, now controlled by the Consolidated Cariboo Company, that the ancient river-channel, known as the Little Lake channel, can be traced toward the southwest to its outlet at the mouth of Morehead creek, but nowhere between the South Fork pit and the mouth of Morehead creek can this channel be attacked by hydraulic mining, owing to the fact that there is no dumpage for tailings. The gravel deposit of the channel near the mouth of Morehead creek is nearly 500 ft. in depth from the present surface to the bed-rock.


2,000 1,900 1,800 1,700 1,600 1,500 1,400 1,300 1,200 1,100 1,000 900 800 700 600 500 400 300 200 100 feet
Cross Section on line of proposed Tunnel No. 1
Original Surface
Ditch
Road
Sluice No.3
Floor of Upper Bench 1902
Sluice No.3
Bedrock
Floor of Lower Bench Aug. 1903
Bottom Oct. 1903
Left Branch Sluice No.1
Right Branch Sluice No.1
Proposed Sluice No.1
Sluice
Cut
Proposed Tunnel No. 1
South Fork of Quesnel River
Bed Rock
Altitude in Feet
2,800 2,750 2,700 2,650 2,600 2,550 2,500 2,450 2,400 2,350 2,300 2,250 2,200 2,150 2,100 2,050 2,000

and about 70 ft. above bed-rock; the width of the cut, at the face, measured on the floor, is about 300 ft., but the maximum width from rim to rim on the original surface is from 900 to 1,100 ft. The length of the cut, from the tailings dump, at the outlet of Dancing Bill gulch, to the face, is 2,300 ft.; the length of the main flume is 1,200 ft. from the dump into the cut; from that point two flumes have been constructed to the face, each having a length of 1,100 ft. The discharge end of the flume is 60 ft. below the original level of the bed-rock; the cost for making this open cut, which is 7 ft. wide at the bottom and 1,000 ft. long, was $27,000, or $1 per cubic yard of material excavated. The pipe-line from the sand-box to the giant is 1,800 ft. long. The pressure at bed-rock is 420 ft. The diameter of the pipe at the sand-box is 48 in., and this pipe tapers to 10 in., at the discharge from the giant. During the season of 1903, only one giant was used with an 8-in. nozzle, which consumed 2,500 miner's inches every 24 hours, or an aggregate during the season of 132,500 inches.

There is a total of 200 ft. of pay-gravel at the face of the cut between the surface and bed-rock, and in this section there are eight strata of high-grade gravel, each averaging 6 ft. in thickness. The position of each of these strata is well defined in the rim-rock on the eastern side of the cut, by marks There are natural exposures which demonstrate this fact.

Some idea of the magnitude of the operations which are being carried on by the Consolidated Cariboo Hydraulic Mining Company, since the season of 1894, can be gathered from the following table of expenditures and receipts, which includes the total expenditure for mine purchases, construction of water-supply system, hydraulic plant, equipment, etc.:

Season.	Expenditures.	Season.	Receipts.
1894	$423,922.83	1894, bullion rec.	$5,161.85
1895	43,860.79	1895, " "	58,571.19
1896	163,865.31	1896, " "	124,026.86
1897	108,544.24	1897, " "	138,520.00
1898	142,801.96	1898, " "	105,141.36
1899	334,639.03	1899, " "	92,678.93
1900	212,918.25	1900, " "	350,083.77
1901	154,454.60	1901, " "	142,273.51
1902	232,723.24	1902, " "	61,395.19
		Total bullion rec.	$1,077,852.66
Miscellaneous, profits on stores, boarding-house, etc., 1894 to 1902, inclusive			28,101.02
Balance			777,774.57
Total			$1,883,728.25

From the published reports to the shareholders of the company, since 1897, I am enabled to gather data summarizing each season's work. These show that the material washed, from 1897 to 1902, inclusive, gave a yield of nearly 11c. per cubic yard from the entire deposit, including mud, slide-rock, and other waste.

The above details have been given in this article, with regard to the operations carried on by this particular company, in order to show, approximately, the results which could be obtained by carrying on hydraulic operations and exploiting and attacking other ancient river-channels which are known to exist and have been crossed by modern streams. Illustrations of such conditions are found to-day on Spanish creek; at points between the north and south forks of the Quesnelle river, where an ancient channel has been cross-cut by Likely gulch; also on the north side of the north fork of the Quesnelle, where an ancient channel parallels for some distance the present channel of the river; also on the north side of the main Quesnelle river, where the channel of Four-Mile creek cross-cuts an ancient channel, showing very extensive deposits of gold-bearing gravel; also on the Horsefly river, at points where that river has cross-cut through deposits of gold-bearing gravel and cement belonging to ancient river-channels.

THE AUTOMOBILE IN A MINING COUNTRY.

By Our Special Correspondent.

As illustrating the possibilities of the automobile in connection with mining, the following is interesting.

The president and one of the directors of a mining company recently left Denver (altitude, 5,170 ft.) in a 21-h. p. auto at 8.10 a. m., and, traveling via Morrison (altitude, 5,753 ft.), Bailey (7,714 ft.), Kenosha (9,972 ft.), Como (9,755 ft.), and Fairplay (9,886 ft.), arrived at Alma (altitude, 10,228 ft.) at 6.45 p. m. the same day. Allowing for two hours' stop for luncheon, the actual running time for the 120 miles was 8 hours and 35 minutes, gaining nearly one mile in elevation and crossing an intervening ridge at Kenosha.

The following morning, in a severe snow and wind storm, the trip was continued to Montgomery (altitude, 11,000 ft.), near which they inspected the mining property of the company. After spending some time on the property, it is said that the return trip was made to Alma, a distance of six miles and a descent of 800 ft., in 18 minutes.

Luncheon was had in Alma (10,228 ft.) and at 12.30 p. m. the start was made for Denver, traveling via Hartsel Hot Springs (8,892 ft.), Divide (9,198 ft.), Cascade cañon (7,421 ft.), Manitou (6,542 ft.), Colorado Springs (5,992 ft.), and Palmer lake (7,237 ft.), arriving in Denver (altitude, 5,170 ft.) a short time after midnight, without an accident of any kind during the whole trip.

On the return journey a stop was made of two hours in Colorado Springs for dinner, making the running time for the entire 175 miles (crossing two intervening ridges at Divide and Palmer lake) a little less than 20 miles an hour, which is remarkable, considering the character of the country traversed. The running time of passenger trains between Alma and Denver is 20 miles per hour.

SPECIFICATIONS FOR CONCRETE.—Until recently it has been the usual practice among engineers to require the crushed stone used for concrete to be screened before mixing with the sand and cement. This requirement is still in force on many engineering works. S. H. Lea, in a paper in *Mines and Minerals* for October, 1903, shows that this specification is founded on an erroneous idea, and that engineers have been for years discarding from their concrete aggregates a valuable part of the stone. The stone screenings may replace sand in the mortar for filling the voids and furnish a stronger mortar. Mortar made of 1 part cement and 3 parts screenings was 115° stronger than mortar made of 1 part cement and 3 parts sand. Mortar made of 1 part cement and 6 parts screenings was 23 per cent. stronger than mortar made of 1 part cement and 3 parts sand. Crusher dust, when compacted, contains a minimum percentage of voids, perhaps less than any other aggregate, and is of the greatest value in forming a dense, compact concrete, wherefore it should not be rejected from the aggregate.

THE WITWATERSRAND ORE DEPOSITS.*

By G. A. DENNY.

Having a pronounced personal leaning to the aqueous theory of the gold deposition in the Rand beds, I might be permitted to briefly state the various views which are held by that school.

1. A common origin for both gold and matrix. This theory premises pre-existing quartz veins, which have been denuded and transported by natural agencies to a shallow sea. Here wave action has brought mechanical operations into force, tending to disintegrate and erode the more friable materials, whether of quartz or other rock, finally concentrating as a residuum only the denser rock fragments in rounded forms, interspersed in a base of pyritic granular material, the later containing the gold particles originally present in the quartz veins or other gangue.

2. Diverse origin of gold and matrix, with contemporaneous deposition. This theory premises again the transport of fragments of eroded rocks into a shallow sea, and in the same period an ingress of iron sulphides and gold, these latter having been derived from agencies analogous to those which are responsible for the filling of fissure veins. It is not insisted upon that there would have been simultaneous deposition of the gold and pyrite with the pebbles and arenaceous matter, but that there is a probability of gradual deposition from a more or less concentrated solution; or that the deposition was caused by organic matter in the shallow sea.

3. The pebbles and some of the granular matter to have been derived from a position geographically different from that whence the gold, pyrite and portion of the granular matter were disintegrated. This theory attempts to overcome the difficulty of explaining the almost entire absence of gold in the pebbles by assuming that the localities which supplied the pebbles, and those which supplied the gold, pyrite, etc., were probably geographically distant from one another, and that the commingling of the particles in the shallow sea was brought about by aqueous transporting agencies.

To all these theories there are many objectors who base their primary difficulty in accepting them on the fact that to all intents and purposes the pebbles in the conglomerate beds are barren of gold. But this is a feature quite as characteristic of Tertiary alluvial deposits as of the banket beds, and, therefore, gives rise to no differentiation of view as to the occurrence of the gold in the one or the other.

The aqueous school hold generally that the bedding conditions of the conglomerates are in all respects similar to those which obtain in fluviatile deposits of more recent origin, and that in particular the existence of laminated bands of pyrites of some inches in thickness, and along quite extensive stretches —as are well observed in the New Goch mine lying immediately below the main reef leader—point conclusively to the view that we have in these conglomerate beds to deal with deposits in which the pyritic material, the sand and the gold were practically simultaneously deposited. The layers of interbedded pyrite referred to in the Gold mine—and observed by the writer also in other mines—show no gold by ordinary panning, but always show by assay a considerable gold value, proving that the particles of gold are incorporated within the pyritic grains, and in the writer's opinion are simply mechanically held. These pyritic bands form in every respect an absolute integer in the general stratigraphy, and owing to the relation they bear to the associated rocks cannot possibly have been subsequently infiltrated, and hence, if the pyritic bands cannot be separated from the original detrital mass, in respect to period of deposition, then equally there can be no differentiation between the period of the gold and the detrital mass, since the gold is lodged within the pyritic grains.

The drifted material throughout the ancient conglomerate beds of the Witwatersrand is composed practically of the same constituents, namely, pebbles of quartz and quartzite, an arenaceous base, pyrite, and—not necessarily—gold. The inference drawn from this is that the rolling and abrasion to which the material has been subjected by mechanical action has ground away all those materials which feebly resisted attrition, leaving only those which by virtue of their hardness were able to survive. There is, however, a very interesting and, as far as the writer is aware, quite unique exception to this general condition—as pointing to some more quiescent localities in the sea bottom—in one portion of the Meyer & Charlton mine. Here, in the main reef, from the second to the fifth levels, and on a length of 500 ft., the quartz pebbles are wholly or in part represented by calcite, assuming, though not in all cases, the same rounded water-worn shapes, and set in a cement which is almost wholly an admixture of calcareous matter and iron pyrite, together with quite high gold values. In many places there may be seen portions of the conglomerate bed in which the proportion of quartz and calcite pebbles are equally distributed, and lying side by side, and again there will be a preponderance either of the one type of pebble or the other. The main reef in the mine indicated is the only one in which this feature of calcite pebbles is to be seen; the main reef leader and south reef showing only the usual silicious pebbles. The immediate country in which the calcite pebbles occur shows considerable disturbance from an interbedded dike which lies between the main reef leader and the main reef throughout this portion of the Rand, otherwise there is nothing to denote any departure from the ordinary conditions of the stratigraphical relations. In the altogether singular case just cited there cannot have been that great eroding action upon the rock fragments composing the detrital mass which it can be imagined was present in general, otherwise a mineral of so soft a character as calcite would not have survived, and it is almost a demonstrable fact that there was erosion present in the neighborhood of the calcite pebbles, by reason of the occurrence of a calcitic granular mass in which the pebbles are now embedded. It is a significant fact that in the whole area of the Witwatersrand formation no clay shales or slates occur, pointing to the fact that all matter in suspension must have been removed by flowing waters prior to the final settlement of the various components of the conglomerate formation.

Attention has been already drawn to the phenomenon of pyritic bands finding a place in the general stratigraphy, and it may now be observed that a no less interesting feature in the banket beds is the presence of water-worn pellets of iron pyrite, these being found in all mines which the writer has examined, to a greater or less degree, but are more particularly to be observed in the Black reef and Battery reef. In some published works of the writer this feature has been dwelt upon, and particularly the fact that these pellets or globules of pyrite are to be seen half embedded in the quartz pebbles, as though these latter, through great temperature and pressure, had partially gelatinized.

The aqueous school readily admit the possibility in the banket formation of chemical action subsequent to the deposition of the gold and pyrite and partial redistribution of these metals, and, in fact, they attribute the flaky and filmy particles of crystalline gold, which are sometimes to be seen on the fracture faces of pebbles, entirely to this cause, but they do not admit the correctness of the theory of later infiltration of gold solutions—derived from some outside source—through the conglomerate beds after partial consolidation of the latter, with which aspect of the case I propose now, however, to deal.

The infiltration theory, when applied to the conglomerates of the Witwatersrand, appears to the writer to require greater stretches of imagination than are warranted by the apparent conditions. In accepting this theory as the most probable explanation of the gold and pyrite contents of the banket beds we must postulate the following conditions:

1. A mass of rounded pebbles and quartzite sand-particles forming a stratified portion of an already consolidated crust, but in such a condition that there are interstitial spaces for the flow of solutions.

2. An enormous area—say from Klerksdorp to Heidelberg, to keep within known limits—in which there was such uniformity of conditions that circulating subterranean waters could permeate more or less equally the entire area, and precipitate their metallic contents among the pebbles and quartzitic material forming the conglomerate beds of one certain horizon, practically neglecting the still porous, sand-like sediments, and the conglomerate beds of later deposition, which, owing to the nature of their constitution, should theoretically be of greater porosity than the beds of older horizons.

A succession of conglomerate beds all of one geological period and practically identical in all respects, both stratigraphically, petrographically and mineralogically, which have shared the same vicissitudes of fold and fracture, and are ramified by dikes of igneous rock of the same age. The lower series of beds only, however, have been permeated by highly charged metalliferous solutions—or, if the others have been so charged, the requisite precipitant for the gold has been wanting—and therefore to-day we have the spectacle of the lowest member of the series only having been proved auriferous to such a degree, and over such an extent, as to make the extraction of the precious metal commercially profitable. At the same time the proportion of iron sulphides is probably considerably greater in some of the younger beds than in the older.

Under postulate (1) the contentious point between the aqueous and infiltration theories is plainly that of the pre-existence of gold and pyrite deposited simultaneously with the pebbly mass, which the former theory asserts. A comparison of the claims of the two theories can only be made by referring the unknown factors to analogous conditions in deposits which are more recent and more easily understood.

In the placer gold deposits of the world we have an exact representation of the imaginary conditions which existed in the far-off geological time when the conglomerate beds of the Rand were deposited. Physically the same conditions exactly reproduced, namely, water-worn pebbles—for the most part granular quartzitic material—and as concomitants gold and iron pyrite, the only difference being that the older deposit, through pressure exerted across the millions of intervening years, has become an aggregated solid mass, and the latter being of comparatively recent deposition, still lies more or less as a disintegrated mass, in the condition in which it was originally laid.

The gold constituent in placers is almost universally held to have been deposited contemporaneously with the other materials making up the whole. Contrary opinions were advanced, based on laboratory tests by Daintree, Selwyn, Wilkinson, Skey and others, who claimed that gold could be made to grow *in situ* by precipitation from solution through the agency of organic matter. Despite, however, very scientific and elaborate arguments, these theories failed to satisfy some important conditions, namely:

1. The enclosure of gold in an arborescent form in pyritic specimens obtained from many alluvial washes, and also the fact that a large percentage of nuggets found near assumed sources of origin retain fragments of attached quartz.

2. The practical fact that gold alluvial always occurs in the neighborhood of auriferous lodes and rocks, and the channels in the immediate neighborhood of the said lodes are always richer in nuggets than those sections more distantly situated.

3. The fact that large masses of gold have been found in quartz veins all over the world, one of the largest having been found in the Monumental mine, at the Sierra Buttes, California. Its weight was 1,146 ounces.

The consensus of opinion remains, therefore, that the gold in placers was deposited contemporaneously with the other materials, and although there have undoubtedly been subsequent changes in these deposits, and, in part, solution and re-precipitation of

* Abstract of discussion arising from a paper by Mr. J. S. Curtis, read before the South African Association of Engineers.

the gold, I believe the views advanced by Daintree and others cited above have only been regarded by geological chemists at large as ingenious theories for a particular form of gold deposition, but as not applicable to the case of alluvial deposits in general.

Since, then, we have a class of alluvial deposits in nowise essentially differing from the ancient conglomerate beds, excepting as to aggregation of constituents, and since there appears to be at least a consensus of opinion favoring the contemporaneous deposition of the gold and pebbles in these younger washes, and since, also, the pebbles of these younger auriferous washes are invariably barren of gold—a feature which is one of the chief obstacles to the acceptance of the aqueous theory in conection with the Rand beds—we have, at least, some firm ground to tread upon in preferring the aqueous to the infiltration theory.

The Hospital Hill shales are receiving a great deal of attention, and the writer claims to have spent upon their study a very considerable amount of labor from one end of the Rand to the other, and has surveyed them in detail over considerable areas, proving conclusively that they are igneous intrusions, or dikes. They split, rejoin, take serpentine courses through the sedimentary strata, or may remain practically interbedded with it for miles. They are in all cases much in evidence in the region of faults, forming in some cases islands of igneous material and surrounded by sedimentary strata dipping toward them from all points of the compass.

At depth, as has been proved in two instances by the writer, the rock loses its shale-like appearance, is sometimes black and laminar in structure, at other times massive and grayish-blue with no laminations, possesses a conchoidal fracture, and is plentifully sprinkled with iron pyrite, the oxidation of which gives rise to the reddish color with which we are all familiar in the decomposed surface outcrop.

Dikes of this shale-like material form for miles—as in the western end of the Rand—the immediate footwall of conglomerate beds, the same condition, however, being repeated in the mines of eastern Rand, in which, from Boksburg eastward, the footwall consists of an igneous rock identical in all respects with the Hospital Hill shales, and weathering at surface into similar red slate-like forms. The writer has attempted to obtain information as to the nature of the minerals entering into the composition of these dikes, but has failed thus far to obtain crystals sufficiently normal for recognition under the microscope, owing to the advanced stage of decomposition. Rocks of exactly the same origin, and called 'slates' in the Boksburg district, have been encountered at a depth of 600 ft. in the Cinderella Deep shaft, and specimens which I have taken from it will be subjected to microscopic analysis. These specimens show in every respect the same physical characteristics as some taken from cross dikes in the Goch mine, which are again in nowise dissimilar to pieces selected from the main reef footwall dike (so-called 'slate') in the Van Ryn mines.

The appearance of the Hospital Hill shales and allied dikes exhibits extraordinary variation. The same bed, if carefully followed and observed, will present, firstly, the appearance of a variegated laminated quartzite, then a greenish, clay-like mass with outcropping 'combs,' the main axes of which are set in the direction of the strike of the dike; farther on all outcrop disappears, and pits sunk on the dike formation show no solid rock fragments, but only a red loam. Still farther on, the outcrop will appear in fragmentary, red, shale-like pieces, having, with the exception of their cross conchoidal fracture, a great similarity to true clay-shales. All of these various appearances are entirely referable to decomposing and segregating agencies, and were specimens taken at depth in the immediate vicinity of the varying outcrop and compared, it would be found that the rock is similar throughout, within the limits I have previously mentioned.

The writer is now engaged upon a geological survey of a section of the western Rand, and the progress of the work shows more and more conclusively that these Hospital Hill shales are essentially intrusive rocks of an age posterior to the formation of the conglomerate beds.

SOLID STEEL CASTINGS.—The London *Engineer* says: "To prevent blow-holes in cast steel, M. Meslans, of Paris, adds fluid steel to an alloy of aluminum with a metal of the alkali earth group, or with lithium. Aluminum alone does not act upon the nitrogen and hydrogen in the fluid metal. The metals of the alkaline earths and lithium possess that property, but they are too dear for use alone. An alloy of aluminum and calcium gives the effect of each element, so that carbon monoxide and also nitrogen and hydrogen can be removed."

DOUGLAS ISLAND, ALASKA.

ORE HANDLING AT THE ALASKA TREADWELL.*

By Robert A. Kinzie.

Chutes, Tramming, etc.—Fig. 1 shows the principal features of the so-called finger-chute which is used throughout the island when a large amount of comparatively coarse rock is to be handled. The fingers are held in place by the weight of an arm, B, and are separately hung from the rod, C C, so that the motion of each is independent of that of the other. For the purpose of raising the fingers so that the ore can be drawn, to the top of each finger is fastened a piece of rope. These pieces are brought to a common center and fastened to the main hoisting-rope, which passes over a pulley in the top of the drift and thence down to a small windlass. When ore is to be drawn, the fingers are raised to the height necessary to allow the ore to pass. When enough has been drawn, the fingers are released and fall into position, stopping the flow. If a large piece is caught on the lip of the chute, it will hold only the finger or fingers that come in contact with it, while the others drop to their normal position. To prevent fine dirt dripping into the roadway, a tail-board is put across the mouth of the chute and held in position by the angle-irons, D.

The cost of putting up chute-raise, cutting-station, and installing finger-chute complete, is as follows:

12 ft. of raise at $9 per ft.	$108.00
80 cars of dirt at 20c.	16.00
Cutting chute-station for windlass.	40.00
40 cars of dirt at 20c.	8.00
Building finger-chute	17.58
Lumber, 700 ft. B. M., at $12.	8.75
Iron and Steel	40.00
Blacksmith work	7.00
Rope	2.00
Total cost	$247.33

The principal advantages gained by using the finger-chutes are dispatch in loading and freedom from blocked chutes and spilling ore on the tracks. Their cost is prohibitive except where a large amount of coarse, dry rock is to be handled, and in the Ready Bullion and Mexican mines they have been in a great measure superseded by the common board-chute, which costs very much less. In the Treadwell they alone are used, and, as stated above, they are being put in at intervals of 20 and 15 ft., instead of 30 ft., as heretofore. The additional expense of

*Abstract from paper entitled 'The Treadwell Group of Mines, Douglas Island, Alaska,' by Robert A. Kinzie, Assistant Superintendent, Treadwell City, Alaska. *Transactions* American Institute of Mining Engineers, October, 1903.

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To all these theories there are many objectors who base their primary difficulty in accepting them on the fact that to all intents and purposes the pebbles in the conglomerate beds are barren of gold. But this is a feature quite as characteristic of Tertiary alluvial deposits as of the banket beds, and, therefore, gives rise to no differentiation of view as to the occurrence of the gold in the one or the other.

The aqueous school hold generally that the bedding conditions of the conglomerates are in all respects similar to those which obtain in fluviatile deposits of more recent origin, and that in particular the existence of laminated bands of pyrites of some inches in thickness, and along quite extensive stretches —as are well observed in the New Goch mine lying immediately below the main reef leader—point conclusively to the view that we have in these conglomerate beds to deal with deposits in which the pyritic material, the sand and the gold were practically simultaneously deposited. The layers of interbedded pyrite referred to in the Gold mine—and observed by the writer also in other mines—show no gold by ordinary panning, but always show by assay a considerable gold value, proving that the particles of gold are incorporated within the pyritic grains, and in the writer's opinion are simply mechanically held. These pyritic bands form in every respect an absolute integer in the general stratigraphy, and owing to the relation they bear to the associated rocks cannot possibly have been subsequently infiltrated, and hence, if the pyritic bands cannot be separated from the original detrital mass, in respect to period of deposition, then equally there can be no differentiation between the period of the gold and the detrital mass, since the gold is lodged within the pyritic grains.

The drifted material throughout the ancient conglomerate beds of the Witwatersrand is composed practically of the same constituents, namely, pebbles of quartz and quartzite, an arenaceous base, pyrite, and—not necessarily—gold. The inference drawn from this is that the rolling and abrasion to which the material has been subjected by mechanical action has ground away all those materials which feebly resisted attrition, leaving only those which by virtue of their hardness were able to survive. There is, however, a very interesting and, as far as the writer is aware, quite unique exception to this general condition—as pointing to some more quiescent localities in the sea bottom—in one portion of the Meyer & Charlton mine. Here, in the main reef, from the second to the fifth levels, and on a length of 500 ft., the quartz pebbles are wholly or in part represented by calcite, assuming, though not in all cases, the same rounded water-worn shapes, and set in a cement which is almost wholly an admixture of calcareous matter and iron pyrite, together with quite high gold values. In many places there may be seen portions of the conglomerate bed in which the proportion of quartz and calcite pebbles are equally distributed, and lying side by side, and again there will be a preponderance either of the one type of pebble or the other. The main reef in the mine indicated is the only one in which this feature of calcite pebbles is to be seen; the main reef leader and south reef showing only the usual silicious pebbles. The immediate country in which the calcite pebbles occur shows considerable disturbance from an interbedded dike which lies between the main reef leader and the main reef throughout this portion of the Rand, otherwise there is nothing to denote any departure from the ordinary conditions of the stratigraphical relations. In the altogether singular case just cited there cannot have been that great eroding action upon the rock fragments composing the detrital mass which it can be imagined was present in general, otherwise a mineral of so soft a character as calcite would not have survived, and it is almost a demonstrable fact that there was erosion present in the neighborhood of the calcite pebbles, by reason of the occurrence of a calcitic granular mass in which the pebbles are now embedded. It is a significant fact that in the whole area of the Witwatersrand formation no clay shales or slates occur, pointing to the fact that all matter in suspension must have been removed by flowing waters prior to the final settlement of the various components of the conglomerate formation.

Attention has been already drawn to the phenomenon of pyritic bands finding a place in the general stratigraphy, and it may now be observed that a no less interesting feature in the banket beds is the presence of water-worn pellets of iron pyrite, these being found in all mines which the writer has examined, to a greater or less degree, but are more particularly to be observed in the Black reef and Battery reef. In some published works of the writer this feature has been dwelt upon, and particularly the fact that these pellets or globules of pyrite are to be seen half embedded in the quartz pebbles, as though these latter, through great temperature and pressure, had partially gelatinized.

The aqueous school readily admit the possibility in the banket formation of chemical action subsequent to the deposition of the gold and pyrite and partial redistribution of these metals, and, in fact, they attribute the flaky and filmy particles of crystalline gold, which are sometimes to be seen on the fracture faces of pebbles, entirely to this cause, but they do not admit the correctness of the theory of later infiltration of gold solutions—derived from some outside source—through the conglomerate beds after partial consolidation of the latter, with which aspect of the case I propose now, however, to deal.

The infiltration theory, when applied to the conglomerates of the Witwatersrand, appears to the writer to require greater stretches of imagination than are warranted by the apparent conditions. In accepting this theory as the most probable explanation of the gold and pyrite contents of the banket beds we must postulate the following conditions:

1. A mass of rounded pebbles and quartzite sand-particles forming a stratified portion of an already consolidated crust, but in such a condition that there are interstitial spaces for the flow of solutions.

2. An enormous area—say from Klerksdorp to Heidelberg, to keep within known limits—in which there was such uniformity of conditions that circulating subterranean waters could permeate more or less equally the entire area, and precipitate their metallic contents among the pebbles and quartzitic material forming the conglomerate beds of one certain horizon, practically neglecting the still porous, sand-like sediments, and the conglomerate beds of later deposition, which, owing to the nature of their constitution, should theoretically be of greater porosity than the beds of older horizons.

A succession of conglomerate beds all of one geological period and practically identical in all respects, both stratigraphically, petrographically and mineralogically, which have shared the same vicissitudes of fold and fracture, and are ramified by dikes of igneous rock of the same age. The lower series of beds only, however, have been permeated by highly charged metalliferous solutions—or, if the others have been so charged, the requisite precipitant for the gold has been wanting—and therefore to-day we have the spectacle of the lowest member of the series only having been proved auriferous to such a degree, and over such an extent, as to make the extraction of the precious metal commercially profitable. At the same time the proportion of iron sulphides is probably considerably greater in some of the younger beds than in the older.

Under postulate (1) the contentious point between the aqueous and infiltration theories is plainly that of the pre-existence of gold and pyrite deposited simultaneously with the pebbly mass, which the former theory asserts. A comparison of the claims of the two theories can only be made by referring the unknown factors to analogous conditions in deposits which are more recent and more easily understood.

In the placer gold deposits of the world we have an exact representation of the imaginary conditions which existed in the far-off geological time when the conglomerate beds of the Rand were deposited. Physically the same conditions exactly reproduced, namely, water-worn pebbles—for the most part granular quartzitic material—and as concomitants gold and iron pyrite, the only difference being that the older deposit, through pressure exerted across the millions of intervening years, has become an aggregated solid mass, and the latter being of comparatively recent deposition, still lies more or less as a disintegrated mass, in the condition in which it was originally laid.

The gold constituent in placers is almost universally held to have been deposited contemporaneously with the other materials making up the whole. Contrary opinions were advanced, based on laboratory tests by Daintree, Selwyn, Wilkinson, Skey and others, who claimed that gold could be made to grow *in situ* by precipitation from solution through the agency of organic matter. Despite, however, very scientific and elaborate arguments, these theories failed to satisfy some important conditions, namely:

1. The enclosure of gold in an arborescent form in pyritic specimens obtained from many alluvial washes, and also the fact that a large percentage of nuggets found near assumed sources of origin retain fragments of attached quartz.

2. The practical fact that gold alluvial always occurs in the neighborhood of auriferous lodes and rocks, and the channels in the immediate neighborhood of the said lodes are always richer in nuggets than those sections more distantly situated.

3. The fact that large masses of gold have been found in quartz veins all over the world, one of the largest having been found in the Monumental mine, at the Sierra Buttes, California. Its weight was 1,146 ounces.

The consensus of opinion remains, therefore, that the gold in placers was deposited contemporaneously with the other materials, and although there have undoubtedly been subsequent changes in these deposits, and, in part, solution and re-precipitation of

* Abstract of discussion arising from a paper by Mr. J. S. Curtis, read before the South African Association of Engineers.

the gold, I believe the views advanced by Daintree and others cited above have only been regarded by geological chemists at large as ingenious theories for a particular form of gold deposition, but as not applicable to the case of alluvial deposits in general.

Since, then, we have a class of alluvial deposits in nowise essentially differing from the ancient conglomerate beds, excepting as to aggregation of constituents, and since there appears to be at least a consensus of opinion favoring the contemporaneous deposition of the gold and pebbles in these younger washes, and since, also, the pebbles of these younger auriferous washes are invariably barren of gold—a feature which is one of the chief obstacles to the acceptance of the aqueous theory in conection with the Rand beds—we have, at least, some firm ground to tread upon in preferring the aqueous to the infiltration theory.

The Hospital Hill shales are receiving a great deal of attention, and the writer claims to have spent upon their study a very considerable amount of labor from one end of the Rand to the other, and has surveyed them in detail over considerable areas, proving conclusively that they are igneous intrusions, or dikes. They split, rejoin, take serpentine courses through the sedimentary strata, or may remain practically interbedded with it for miles. They are in all cases much in evidence in the region of faults, forming in some cases islands of igneous material and surrounded by sedimentary strata dipping toward them from all points of the compass.

At depth, as has been proved in two instances by the writer, the rock loses its shale-like appearance, is sometimes black and laminar in structure, at other times massive and grayish-blue with no laminations, possesses a conchoidal fracture, and is plentifully sprinkled with iron pyrite, the oxidation of which gives rise to the reddish color with which we are all familiar in the decomposed surface outcrop.

Dikes of this shale-like material form for miles—as in the western end of the Rand—the immediate footwall of conglomerate beds, the same condition, however, being repeated in the mines of eastern Rand, in which, from Boksburg eastward, the footwall consists of an igneous rock identical in all respects with the Hospital Hill shales, and weathering at surface into similar red slate-like forms. The writer has attempted to obtain information as to the nature of the minerals entering into the composition of these dikes, but has failed thus far to obtain crystals sufficiently normal for recognition under the microscope, owing to the advanced stage of decomposition. Rocks of exactly the same origin, and called 'slates' in the Boksburg district, have been encountered at a depth of 600 ft. in the Cinderella Deep shaft, and specimens which I have taken from it will be subjected to microscopic analysis. These specimens show in every respect the same physical characteristics as some taken from cross dikes in the Goch mine, which are again in nowise dissimilar to pieces selected from the main reef footwall dike (so-called 'slate') in the Van Ryn mines.

The appearance of the Hospital Hill shales and allied dikes exhibits extraordinary variation. The same bed, if carefully followed and observed, will present, firstly, the appearance of a variegated laminated quartzite, then a greenish, clay-like mass with outcropping 'combs,' the main axes of which are set in the direction of the strike of the dike; farther on all outcrop disappears, and pits sunk on the dike formation show no solid rock fragments, but only a red loam. Still farther on, the outcrop will appear in fragmentary, red, shale-like pieces, having, with the exception of their cross conchoidal fracture, a great similarity to true clay-shales. All of these various appearances are entirely referable to decomposing and segregating agencies, and were specimens taken at depth in the immediate vicinity of the varying outcrop and compared, it would be found that the rock is similar throughout, within the limits I have previously mentioned.

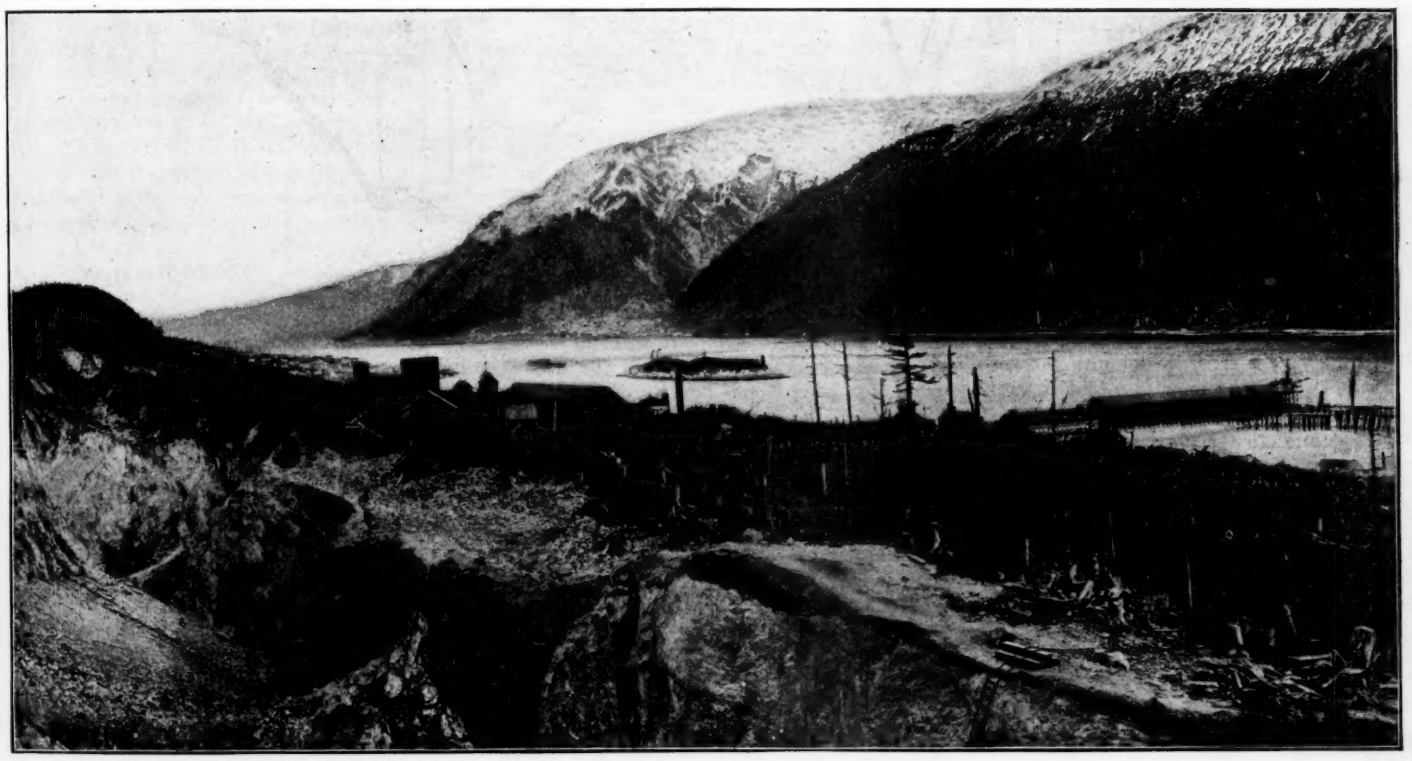
The writer is now engaged upon a geological survey of a section of the western Rand, and the progress of the work shows more and more conclusively that these Hospital Hill shales are essentially intrusive rocks of an age posterior to the formation of the conglomerate beds.

SOLID STEEL CASTINGS.—The London *Engineer* says: "To prevent blow-holes in cast steel, M. Meslans, of Paris, adds fluid steel to an alloy of aluminum with a metal of the alkali earth group, or with lithium. Aluminum alone does not act upon the nitrogen and hydrogen in the fluid metal. The metals of the alkaline earths and lithium possess that property, but they are too dear for use alone. An alloy of aluminum and calcium gives the effect of each element, so that carbon monoxide and also nitrogen and hydrogen can be removed."

ORE HANDLING AT THE ALASKA TREADWELL.*

By ROBERT A. KINZIE.

Chutes, Tramming, etc.—Fig. 1 shows the principal features of the so-called finger-chute which is used throughout the island when a large amount of comparatively coarse rock is to be handled. The fingers are held in place by the weight of an arm, B, and are separately hung from the rod, C C, so that the motion of each is independent of that of the other. For the purpose of raising the fingers so that the ore can be drawn, to the top of each finger is fastened a piece of rope. These pieces are brought to a common center and fastened to the main hoisting-rope, which passes over a pulley in the top of the drift and thence down to a small windlass. When ore is to be drawn, the fingers are raised to the height necessary to allow the ore to pass. When enough has been drawn, the fingers are released and fall into position, stopping the flow. If a large piece is caught on the lip of the chute, it will hold only the finger or fingers that come in contact with it, while the others drop to their normal position. To prevent fine dirt dripping into the roadway, a tail-board is put across the mouth of the chute and held in position by the angle-irons, D.



DOUGLAS ISLAND, ALASKA.

The cost of putting up chute-raise, cutting-station, and installing finger-chute complete, is as follows:

12 ft. of raise at $9 per ft.	$108.00
80 cars of dirt at 20c.	16.00
Cutting chute-station for windlass	40.00
40 cars of dirt at 20c.	8.00
Building finger-chute	17.58
Lumber, 700 ft. B. M., at $12	8.75
Iron and Steel	40.00
Blacksmith work	7.00
Rope	2.00
Total cost	$247.33

The principal advantages gained by using the finger-chutes are dispatch in loading and freedom from blocked chutes and spilling ore on the tracks. Their cost is prohibitive except where a large amount of coarse, dry rock is to be handled, and in the Ready Bullion and Mexican mines they have been in a great measure superseded by the common board-chute, which costs very much less. In the Treadwell they alone are used, and, as stated above, they are being put in at intervals of 20 and 15 ft., instead of 30 ft., as heretofore. The additional expense of

*Abstract from paper entitled 'The Treadwell Group of Mines, Douglas Island, Alaska,' by Robert A. Kinzie, Assistant Superintendent, Treadwell City, Alaska. *Transactions* American Institute of Mining Engineers, October, 1903.

putting in finger-chutes every 15 ft., instead of every 30 ft., is $8.33 per foot of drift. The saving in shoveling in a stope 60-ft. wide would be $12 per foot, making a saving of $3.67 by additional chutes; to which must be added the advantage of not losing time by chutes getting blocked. With chutes 15 ft. apart, the train can move with brief stops and be practically drawing from the same part of the stope. The blocked chute can be freed by one man and not delay the train more than 10 minutes. Also, in case the back of the stope should become so bad that men could not get in to work the ore into chutes, more than twice as much could be drawn from the stope with chutes 15 ft. apart.

A modification of the finger-chute is used for the skip and bin-chutes. They are made with six fingers and are 6 in. wider than the ordinary chute. A trough is added to carry the ore from the lip to the edge of the shaft. It is 9 ft. long, 3 in. wide, with an inclination of 36°, so that the ore will run freely from the lip to the skip. Attached to the end of the trough is a hinged door made of ½-in. steel plate. When raised, it immediately and entirely stops the flow, and allows the trough to be filled in readiness for loading the next skip. It takes, on an average, 20 seconds to load a 4-ton skip and make everything clear for hoisting.

Table I. gives the duty of machine-drills in the different characters of work for which they are employed.

Under the heading "Pounds powder used per machine-drill per 10-hour shift" is given the actual amount of powder used for blasting the holes drilled, but it does not include powder used for bull-dozing, blasting chutes, etc. The cost of this powder is given under the head of explosives; it varies with the different mines, and from month to month in the same mine, according to the varying expense of handling and sales to outside parties.

The "Labor-Drilling" cost given is the actual expense of machine-men and helpers. The men do a great deal of the boring-down and trimming, and the above cost will vary accordingly.

The last column under "Average cost per machine-drill in 10 hours" gives the cost of drill-sharpening, repairs, power, and all other costs not included under the heads of labor, drilling and explosives.

Tramming.—At present there are three methods of tramming in use: by hand, with the help of horses, and by endless-rope haulage.

When the tramming is done by hand, one man loads a car, pushes it to the ore-bin, dumps, and returns it to the chute. Ordinarily there are several men tramming from the same chute, and a great deal of time is lost by awaiting their turn to load; and again at the bin there is another wait until the last car is dumped before starting on the return trip.

By using horses, the lost time is minimized by making up two or more trains of 8 cars each, so that when one train is dumping another is loading and the third is on the way.

While there is a marked saving in men by using horses, their first cost is considerable, a horse costing $180 delivered; and their depreciation is another factor to be considered, for they are continually meeting with accidents, which either disable them permanently or lay then off at a cost of $1 a day for maintenance.

By the use of mechanical haulage, both the lost time and cost per ton has been greatly reduced. The system is essentially the so-called tail-rope system in use in numerous places, but modified to make it conform with underground conditions. On the hanging-wall side of the ore-bin is situated a double-drum winding-engine, size of cylinders 7 in. by 10 in.,

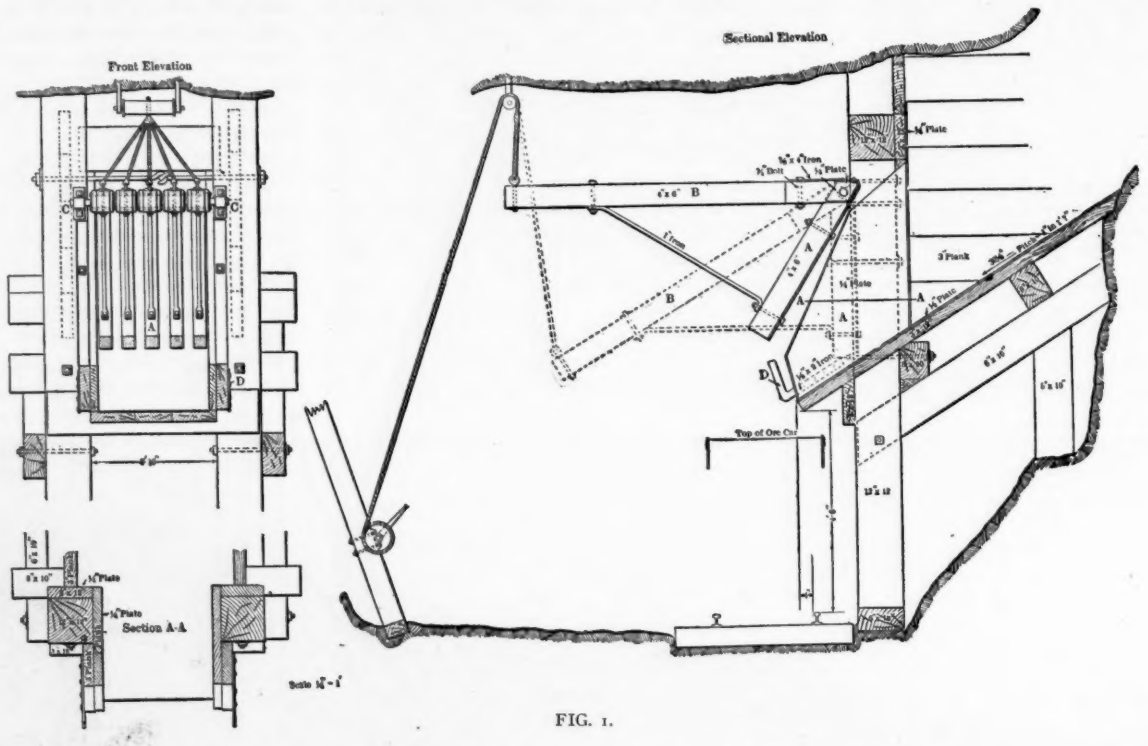


FIG. 1.

TABLE I.—*Showing Duty of Machine-Drills on Douglas Island, Alaska.* "B."

Mine.	Character of Work.	Average Number Feet Drilled Per Machine-Drill Per 10-Hour Shift.	Pounds Powder Used Per Machine-Drill Per 10-Hour Shift.	Average Number Tons Broken Per Machine-Drill Per 10-Hour Shift.	Average Costs Per Machine-Drill in 10 Hours. Labor-Drilling.	Explosives.	Drill-Sharpening, Repairs, Supplies, Power, etc.
Treadwell mine.	Pits	36.35	15.89	69.69	.....	$2.50	.....
	Stopes	28.69	12.53	34.96	.....	1.97	.....
	Cutting Out	26.16	11.45	12.30	.....	1.80	.....
	Drifting	38.22	16.73	9.60	.....	2.63	.....
	Raising	34.18	14.95	7.60	.....	2.35	.....
	Shaft Sinking	31.12	13.65	9.28	.....	2.15	.....
Total		32.30	14.13	39.67	$7.87	$2.22	$2.10
Mexican mine.	Pits	34.61	15.64	49.70	.....	$2.46	.....
	Stopes	31.78	13.90	36.19	.....	2.26	.....
	Cutting Out	31.40	13.74	18.40	.....	2.23	.....
	Drifting	40.83	17.86	11.40	.....	2.91	.....
	Raising	35.29	15.44	14.23	.....	2.51	.....
	Shaft Sinking	41.00	17.92	20.92	.....	2.92	.....
Total		34.59	15.13	25.52	$7.95	$2.46	$2.23
Ready Bullion mine.	Pits	39.63	17.34	197.06	.....	$2.82	.....
	Stopes	29.85	12.96	38.04	.....	2.11	.....
	Cutting Out	26.23	11.48	17.06	.....	1.87	.....
	Drifting	30.16	13.19	10.33	.....	2.15	.....
	Raising	26.44	11.57	6.96	.....	1.88	.....
	Shaft Sinking	26.80	11.72	15.21	.....	1.91	.....
Total		28.58	12.49	28.19	$7.03	$2.03	$3.02
700 Foot mine.	Pits	36.41	15.92	55.15	.....	$2.59	.....
	Stopes	29.26	12.81	35.68	.....	2.09	.....
	Cutting Out	26.00	11.37	12.40	.....	1.85	.....
	Drifting	38.00	17.12	15.64	.....	2.71	.....
	Raising	33.60	14.70	8.60	.....	2.39	.....
	Shaft Sinking	32.16	14.07	20.50	.....	2.29	.....
Tota		31.33	13.72	27.41	$6.48	$2.23	$3.23
Average Totals		31.92	13.96	33.54	$7.58	$2.27	$2.42

with drums 2 ft. 8 in. in diameter. Set directly in front of and close to the engine are four posts. Two are designed to carry a sheave suspended on a horizontal axle, for guiding the upper rope and causing it to wind smoothly on the drum, while the remaining two support a roller which answers the same purpose for the lower rope. From the drum to the point where the drifts branch out, the upper rope is supported by snatch-blocks suspended from the back of the drift and by sheaves at the ends of arms securely fastened to 10 by 10-in. posts. A horizontal sheave is placed at the point where the direction of the rope is changed to allow it to enter the drift. Since this sheave is subject to severe strains, it should be held rigidly in place by horizontal 10 by 10 in. pieces securely bolted to the 10 by 10 in. posts. From this point to the end of the drift the upper rope is carried by sheaves fastened to the posts of the finger-chutes, immediately under the protruding lip, where it will be out of the way and at the same time protected from blasting. The sheaves are inclined so that the greatest strain is at right-angles to the axle, and the rope prevented from jumping out by pegs placed across the top of the sheave. The lower rope is kept in line by a series of horizontal sheaves fastened to blocks, their number depending on the crookedness of the tunnel; and it is prevented from dragging on the ground by iron rollers placed between the tracks.

The lower sheaves (Fig. 2) are placed as near the track as possible, and are mounted on pieces of 10 by 10-in. timber securely braced against the side of the tunnel. To guide the rope into the sheave the front end of the block is beveled off to the height of the rail. On the top of the sheave is a piece of wrought-iron, bent as shown in cut, its object being to prevent the rope from jumping out and also to hold the axle in a vertical position. At the ends of the various drifts, or at convenient points in them, is placed a series of sheaves, or a single sheave, as the case may be, to carry the end-loop of the rope. At first was tried a sheave mounted on a truck and fastened by clamps to the rails; but this proved a failure on account of the great strain, pulling up the track and doing other damage.

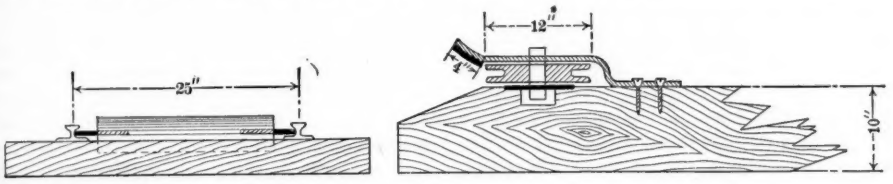


FIG. 2.

For purposes of signaling, two bare iron-wires are run the entire length of the tunnel. These wires are parallel and 4 in. apart. At the winding-engine they connect with a bell and signal light, while the current is obtained from the electric-light circuit. The signals are given by placing an iron candlestick across the two wires or by means of a special portable signal device. As the wires are bare, signals can be given from any point, which is a great convenience in case of the train jumping the track or other accident. Two trains are used on each level, consisting of seven cars, each car holding 1½ tons. While one train is discharging at the shaft ore-bin, the other is loading. The trains are run at a maximum speed of 800 ft. per minute, and at present their capacity is 750 tons of ore per shift, or 1,500 tons per day.

Sampling, Maps and Assaying.—Close attention is paid to sampling and recording the assay-value of the ore. As a drift, raise, cross-cut, or other development-work is in progress, a sample is taken after each round has been blasted. These samples are taken by either the shift-boss or the foreman, and their description and location is recorded on a special tag, enclosed with the sample in the sack.

At intervals of 15 ft., and closer if there is any doubt as to the value of the ore, lines of samples—each sample being 10 ft. long and varying with the nature of the ore—are taken across the back of the stopes at right-angles to the strike. These samples are taken by cutting trenches, usually 10 ft. long, 4 in. wide across the strike of the ore, and 5 ft. apart, for the entire length of the new work. A hand-sample is taken from each car at the ore-bins, and again at the crushers a grab-sample is taken by means of large dippers, before the ore goes to the mill.

TABLE II.—*Showing Number and Percentage of Different Nationalities Working at the Mines on Douglas Island, Alaska.*

Nationalities.	Per cent.	Tread-well.	Mexi-can.	Ready Bullion.	Total.
Americans	26.5	147	46	27	220
Norwegians, Swedes and Danes	25.0	104	60	41	205
Scotch	1.0	4	2	5	11
Austrians and Slavonians.	24.5	113	29	58	200
Irish	3.5	22	5	2	29
Germans	3.0	13	7	4	24
French	..	2	..	..	2
English	2.5	16	2	2	20
Italians	3.0	6	8	9	23
Finns	5.0	17	20	3	40
Russians	1.0	5	3	..	8
Turks	..	1	..	..	1
Japanese	4.0	17	15	..	32
Indians	1.0	6	2	1	9
Totals	100.	473	199	152	824

The only samples taken in the mill are from the tailings and sulphurets. The tailings-sample is taken either at the tail of the vanners by means of dippers, or at the end of the tailings-launders by means of automatic samplers. The sulphurets are sampled by means of the ordinary grooved sampling-rod. When the mine-sample reaches the assay office it weighs from 50 to 150 lb.

The assay office is fitted with the usual grinding machinery, two double-muffle furnaces, pulp and bullion-scales, etc. There is an average of about one hundred samples assayed each day, and the returns from a sample are obtained the day after it is taken. All samples are assayed for gold only. In connection with the assay office are the retorting and melting-rooms for refining the amalgam from the mills.

A complete set of maps is kept, showing in detail the underground and surface-workings of the mines, also the value and position of each sample taken and the quantity of broken ore and reserves.

THE COLORIMETRIC ESTIMATION OF GOLD IN CYANIDE SOLUTIONS.

By HENRY R. CASSEL.

There has been a need since the advent of cyanidation for a quick and accurate method of estimating the gold contained in cyanide solutions. The usual method, which consists in evaporating the solution down to dryness in a lead basin or with litharge, is, to say the least of it, lengthy, cumbersome, and expensive; the results, however, are accurate. Such great accuracy in ordinary operations is not always required. For example, in assaying the solutions from zinc boxes an error of a few grains of gold per ton of solution is practically negligible, as the solution is used over again.

It has long been a well-known fact that the 'Purple of Cassius' test, which is so exceedingly valuable in chlorination works, is useless for cyanide solutions, as the purple coloration will not appear. The writer has discovered an easy and quick method of obviating this difficulty. It is found that if the cyanogen present be eliminated, as it readily can be by oxidation or other means, the purple color will then form with just as great delicacy as if pure solutions were employed.

It occurred to the writer that potassium bromate, in conjunction with concentrated sulphuric acid, would form the ideal oxidizing agent. About 50 cc. of an ordinary working solution of cyanide, containing gold, is taken, a small amount of potassium bromate is added, and then concentrated sulphuric acid until all effervescence ceases. The bromine in solution is then boiled off, and a few drops of hydrochloric acid and stannous chloride are added. The purple color forms almost immediately on the addition of the stannous chloride.

The following equation has been suggested as representing the oxidation:

$$2KAu(CN)_2 + 6KBrO_3 + 4H_2SO_4 = 4K_2SO_4 + 2AuBr_3 + 4CO_2 + 2N_2 + 4H_2O + 3O_2$$

It has been proved by the barium hydroxide test that carbon dioxide is evolved; this, however, is a matter of minor importance. The chief point to be noted is the entire elimination of the cyanogen by oxidation.

The results of this preliminary experiment having proved satisfactory, tests were next made to find out the delicacy of the reaction, and by careful manipulation 1 grain of gold per ton of solution could be detected. A 15-grain tube of gold chloride manufactured and guaranteed by Messrs. Johnson & Sons was taken, and the contents were dissolved in a sufficient quantity of commercial cyanide solution, so that it contained 10 oz. of gold per ton. It has been found that the strength of the cyanide solution is immaterial. This solution gave an intense black precipitate with stannous chloride after oxidation with bromate, while before oxidation no coloration could be obtained. Weaker solutions were then tried, and it was found that the purple color could be readily detected without any special precautions when the solution contained 4 dwt. of gold per ton, and, if held to a white background, 1 dwt. is easily visible. Smaller quantities are best judged by comparison with a tube containing a similar volume of the original gold solution; 1 grain of gold per ton is distinctly visible by this means. Dr. T. K. Rose states[1] that 1 grain of gold in 6 tons of water, that is, one of gold in 100,000,000 parts of water, gives a distinct reaction; to work to such delicate quantities as this, however, requires the employment of several liters of solution, and this makes the oxidation troublesome. Therefore, solutions too weak to give a color should first be concentrated by evaporation before the test is applied. If they be too concentrated they are best diluted, as a dark solution cannot be accurately judged.

The following has been found to be the best method of employing the test:

A measured quantity of the cyanide solution to be tested (about 10 cc. is a convenient quantity) is put into a boiling-tube. About 0.5 of a gram of potassium bromate is next added, and then pure concentrated sulphuric acid gradually, with shaking, until the action starts; once started, it will go on without the further addition of acid. When the action has ceased, add drop by drop, preferably from a dropping-bottle, a saturated solution of stannous chloride (best prepared by dissolving metallic tin in hydrochloric acid) until the solution is just colorless. The purple color will now form, and will be most intense after standing for about half a minute. If left standing too long more bromine may be freed, and this spoils the color. There is no necessity to boil off the bromine before adding the stannous chloride. It is quite possible to carry out a complete test in two and a half minutes.

Other methods of eliminating the cyanogen have been tried. Several oxidizing agents other than bromate and sulphuric acid have been employed.

Potassium bromate being a salt only to be found in well-stocked laboratories, it was thought advisable to find some common substance which would act just as well. Potassium chlorate and hydrochloric acid act fairly well, but require a large amount of

[1] "Metallurgy of Gold," p. 27.

boiling. Potassium chlorate and sulphuric acid have similar disadvantages. Aqua regia gives no color at all; the excess of acid cannot be got rid of without evaporating to dryness. The cyanide may be expelled by continued boiling with sulphuric acid if the percentage present be small; the color, however, does not show up readily. The following method of oxidation has been found to yield good results. To some of the cyanide solution to be tested potassium bromide is added and then a little sodium peroxide, or potassium peroxide; bromide is freed; sulphuric acid is then added to the solution until neutral. If to the solution, thus oxidized, hydrochloric acid and stannous chloride be added, the purple color will form with great readiness. This process is, again, essentially one of oxidation, and can probably be represented as follows:

$$KAu(CN)_2 + 6K_2O_2 + 3KBr + 8H_2SO_4 = AuBr_3 + 8K_2SO_4 + 2CO_2 + 2N_4 + 8H_2O.$$

There is one other method by which the writer has found it possible to get rid of the cyanogen. If to the solution to be tested about one-third of its bulk of concentrated ammonia (sp. gr. 0.880) be added first, and then concentrated sulphuric acid until neutral, the solution will readily give the 'Purple of Cassius' reaction. This process cannot well be called one of oxidation; the ammonia probably forms substances with the cyanide, which are totally eliminated by the sulphuric acid.[2] In all cases the reaction depends upon the decomposition of the cyanide of gold.

MINERAL PRODUCTION OF AUSTRIA IN 1902.

The final returns of the mineral and metallurgical production of Austria in 1902 have just been made public by the Minister of Agriculture. The value of the entire output, after allowing for certain duplications, such as coal used in making coke, iron ore converted into pig iron, etc., was 288,050,869 crowns, or approximately $57,610,174.

The production of coal is reported, as below, in metric tons, the figures for 1901 being given for comparison:

	1901.	1902.	Changes.
Coal	22,473,509	22,139,683	D. 333,826
Brown coal (lignite)	11,748,840	11,045,039	D. 703,801
Totals	34,222,349	33,184,722	D. 1,037,627

It will be observed that there was a marked falling off in the output of both coal and lignite, the decrease for the former amounting to 6 per cent, and for the latter, 1.5 per cent. This was largely due to labor troubles and the general depression that has prevailed throughout Austria for some time past. The decline was reflected in the production of coke, which fell from 1,275,889 tons in 1901, to 1,160,846 tons in 1902.

The production of iron in 1901 and 1902 was as follows:

	1901.	1902.	Changes.
Pig iron	884,844	831,544	D. 53,300
Re-melted iron	145,355	160,282	I. 14,927
Totals	1,030,199	991,826	D. 38,373

While there was an increase in the output of re-melted iron, this was more than offset by the reduced output of pig iron, and the total for 1902 shows a decrease of 3.7 per cent, as compared with that of the preceding year.

The production of ores and metals other than those mentioned above was as follows in metric tons and kilograms:

	1901.	1902.	Changes.
Gold, kgs.	47	7	D. 40
Silver, kgs.	40,205	39,544	D. 661
Quicksilver, tons	525	511	D. 14
Copper, "	776	914	I. 138
Lead, "	10,161	11,264	I. 1,103
Spelter, "	6,974	7,711	I. 737
Tin, "	49	50	I. 1
Antimony, "	43	4	D. 39
Iron ore, "	1,963,246	1,744,298	D. 218,948
Pyrites, "	4,910	3,720	D. 1,190
Manganese ore, "	7,796	5,646	D. 2,150
Graphite, "	29,992	29,527	D. 465
Asphalt rock, "	541	897	I. 356
Mineral paints, "	1,700	1,485	D. 215

[2]Fresenius, "Quantitative Analysis," page 85.

This table shows increases in the production of lead, copper, spelter, tin and asphalt rock, but decreases in the other substances. In iron ore there was a falling off of 11 per cent.

In addition to the items mentioned, there were small outputs of copperas, litharge, nickel, cobalt, zinc dust, uranium salts, copperas, sulphuric acid and alum.

ACCIDENTS IN MICHIGAN COPPER MINING.

There were 13,629 men employed in the copper mines of Houghton county, Mich., during the year ending September 30, according to the annual report of Capt. Josiah Hall, mine inspector. In 1902 the number of men employed was 14,130, more than at any previous period in the history of the Lake copper mining industry. It is interesting to note that the reduction in forces in Houghton county during the year covered by the mine inspector's report was only 501. The men laid off at the older properties were to a large extent taken on at the new mines.

The percentage of fatal accidents for the year just ended was about the average for the Lake district, which is lower than the percentage generally prevailing in mining communities. In 1902 it was higher than usual, being 0.0031, while for several years preceding it ranged from 0.0020 to 0.0025. There were 33 casualties in the mines of Houghton county last year, 31 underground and two on surface. There were also eight non-fatal accidents reported to the mine inspector. The fatalities by mines were as follows: Arcadian, 1; Atlantic, 1; Baltic, 1; Calumet & Hecla, 5; Champion, 1; Franklin, 3; Isle Royale, 2; Kearsarge, 4; Quincy, 5; Trimountain, 3; Tamarack, 4; Wolverine, 1; Wyandot, 1; Winona, 1. By nationalities: Austrian, 7; English, 5; Finnish, 9; German, 1; Greek, 1; Italian, 6; Swede, 3; Scotch, 1. The following gives the causes of the fatalities and the number of deaths resulting from each: Fall of rock, 7; fall of vein rock, 3; premature explosion, 1; caught between car and timber, 4; fell down shaft, 7; premature blast, 1; caught in machinery, 1; pulled rock on himself, 1; struck by car, 3; blasted, 3; fall of drilling machine, 1; run over by cage, 1.

The following table gives the number of men employed, the number of fatalities and the percentage of men at work who met death in the mines of Houghton county for the past fifteen years:

Year.	No. employees.	Killed.	No. per 1,000 employed.
1889	6,480	21	3.23
1890	7,310	35	4.80
1891	7,702	28	3.60
1892	7,640	21	2.70
1893	7,591	23	3.03
1894	7,348	22	2.99
1895	7,249	46	6.30
1896	8,170	19	2.30
1897	8,726	26	2.98
1898	10,469	23	2.20
1899	13,051	27	2.07
1900	13,971	36	2.58
1901	13,498	33	2.44
1902	14,130	44	3.13
1903	13,629	33	2.42

Ever since the drop in the price of copper it has been expected that the Lake Superior copper mines would reduce wages, but such action has not yet been taken and probably will not be. The average wages paid miners and mine employees are now as high as at any time since 1873, and six times as many men are now employed as thirty years ago. The earnings of the miners vary greatly. The Calumet & Hecla has always paid the highest wages, while the Franklin pays about the lowest.

MINING MACHINES IN GREAT BRITAIN.—The committee appointed by the North of England Institute of Mining and Mechanical Engineers has issued the first part of its report on Mechanical Coal Cutting. This deals exclusively with longwall machines. It appears that compressed air is still used in a majority of the machines, although the application of electricity is increasing. The average amount of coal cut per machine last year was 10,000 tons.

THE HENDRYX PROCESS OF ELECTRO-CYANIDING.

By Our Special Correspondent.

A testing plant of the Hendryx process of electro-cyaniding is in operation at the laboratory of Mr. C. M. Fassett, of Spokane, Washington, for the purpose of demonstrating, to mining men and others interested, the advantages claimed for this process for the extraction of the precious metals from ores suitable for cyanide treatment. The inventor claims that the process will effectively treat all ores amenable to the ordinary method of cyaniding, and, besides, can be applied to many others that the latter cannot be used for, including ores carrying from 1 to 3 per cent copper; further, that complete extraction of the values can be made in from three to six hours, according to the adaptability of the ores to this process, and that, consequently, fresh pulp can be fed to the tank four to six times a day. The cost of extraction also is stated to be low—from 25 to 50c. per ton.

If the ore be found amenable to this process of treatment it is crushed very fine, to ascertain what percentage of extraction is obtainable. Then tests are made with various crushings, to determine the size best adapted for the treatment of that particular kind of ore. This determined, the pulp is fed into a very weak solution of cyanide contained in a circular tank, having a funnel-shaped bottom, above which is a cylinder rising to near the top of the tank. A propeller or agitators within this cylinder causes the pulp in solution to rise to the top, whence it flows over sloping plates to the sides of the tank and there sinks to a point below the agitator. The contents of the tank are thus kept in continuous agitation until the gold and silver have been deposited on electrically charged plates. Experiments are being made with lead-coated iron plates, these giving a softer backing and permitting a closer saving when the plates are scraped. It is claimed that the electric current used for depositing the precious metals on the plates not only accomplishes this purpose, but also aids in the deposition of the gold and silver from solution and regenerates a considerable proportion of the cyanide that would be lost were the ordinary agitation process used only.

The contents of the tank can easily be sampled at any time by catching in a cup a little of the liquid as it flows from the cylinder, and having it tested to tell at that stage of the operations how the extraction is proceeding. The contents of the tank can be drawn off into settling tanks and a fresh supply of pulp fed in without stopping the agitator. After the slimes and tailings have settled, the solution can be siphoned off for re-use. The solution is heated before use, the deposition being much more rapid with a warm solution. The total extraction made is from 80 to 96 per cent of the assay values.

The Hendryx process has already been introduced into Mexico, Arizona and California. The Mexican plant has a capacity of 120 tons daily; the Arizona plant has treated 12,000 tons; the California plant is only a small one, but the process will soon be in use in that State on a commercial scale.

MOLYBDENITE IN ONTARIO.—The recently published report of the Bureau of Mines of Ontario says: "There was a small quantity of molybdenite raised in Ontario last year, amounting to 6,500 lb., and having a value of $400. This is the first appearance of the mineral among the products of the Province. It was taken from a deposit in the township of Laxton by Mr. John Webber, of Toronto, and his associates. Many deposits, or shows, of molybdenite have been brought to notice in Ontario during the last two or three years, since the demand for it became active, but upon very few of them has work enough been done to prove their extent or value. Molybdenite appears to be essentially pockety in its manner of occurrence, and large bodies are exceptional. The value of the substance, however, is such that even a small deposit, if not too sparingly disseminated throughout a gangue rock difficult of separation, may repay the cost of working it."

CAPACITY OF BLAKE CRUSHERS.

The capacity of a crusher of the Blake type depends chiefly upon the width of the jaw, the speed at which it is driven, the size to which the ore or stone is crushed, and the character of the ore or stone. As in the case of rolls and other crushing machines, the capacity is more accurately stated in terms of volume, *i. e.*, cubic yards or cubic feet, than in terms of weight, because, all other things being equal, a crusher will deliver more tons of a heavy ore than of a light ore. With respect to the character of the material to be crushed, hard ore or stone that breaks with a snap will go through faster than less brittle stuff; one of the hardest materials to crush is soft, talcose, tough stuff, that mashes and is broken only with difficulty. With some such kinds of material it is almost impossible to get it through the crusher at all.

There are practically no published data as to the capacity of crushers on different kinds of ore, nor of the power required. The data given in the catalogues of various manufacturers are quite unreliable, varying greatly. As a matter of interest we have summarized the statements with respect to the 9-by-15-in. machine given in the catalogues of eight prominent manufacturers. The following table gives the total weight of the machine manufactured by each, the speed at which it is recommended to drive, the estimated horsepower required, and the tons of product made per hour in crushing to about 1.5 inch size. Many of these manufacturers state that the figures quoted are only approximate, but few express any recognition of the fact that output should be stated in cubic feet and not in tons, and few specify as to the character of ore upon which their figures are based. The presumption is that quartzose ore is especially referred to.

Data of 9-in. by 15-in. Blake Crushers.

No.	Weight, lbs.	Speed, r. p. m.	H. P. required.	Tons product per hour.
1	16,000	250	10	15.0
2	15,000	250	12	5.5*b*
3	16,900	250	10	10.5
4	15,750	300	12	5.5*c*
5	14,000	275	15	11.0*f*
6*a*	16,500	275	12	16.0*d*
7	16,500	250	10	8.0*e*
8	16,000	250	10	10.5*f*

(*a*) The crusher made by this manufacturer is 10 in. by 16 in.
(*b*) This manufacturer rates the capacity as 10 tons per hour in crushing to 2.5-in. size, 8 tons in crushing to 2-in. size, and 5.5 tons in crushing to 1.5-in. size.
(*c*) This manufacturer gives the same figures as the one quoted above, with the additional statement that in crushing to 1-in. size the capacity is only 4 tons per hour.
(*d*) The size of the crushed product is not stated by this manufacturer.
(*e*) This manufacturer rates the capacity as 8 tons per hour in crushing to 2-in. size, 4 tons in crushing to 1-in. size, and 2 tons in crushing to 0.5-in. size.
(*f*) This figure is for crushing to 2-in. size.

The machines to which the data here tabulated refer are built by well-known and reputable firms, whose work has stood the test of years. It will be observed that there is very little difference in the quantity of material put in any of them, the weights running in all cases close to 16,000 lbs. There is a close agreement in the idea that the proper speed for these machines is 250 to 275 revolutions per minute, and with a single exception the estimate of power required is 10 to 12 horse power. With respect to the rated capacity, however, there is a wide variation, this ranging from 5.5 tons per hour crushed to 1.5-in. size up to 15 tons per hour crushed to the same size. It is obviously impossible that two equally well-built crushers of the same size and type should show such differences as 0.66 h. p. and 2 h. p. per ton of stone broken (in all well-built crushers the friction is about the same), and the reporting of such data betrays ignorance somewhere. There is no doubt that the manufacturers who report such an hourly capacity as 15 tons greatly overestimate the actual efficiency of their machines. One well-known manufacturer, who treats of the subject more carefully than most, states that in crushing "ordinary material," with the jaws of the crusher set about 2 in. apart when closed, from 1.25 to 1.5 h. p. per ton of material crushed is usually required.

For practical purposes the assumption that a 9-in. by 15-in. Blake crusher, run at 250 revolutions per minute, will break to 1.5-in. size about 5 to 7 tons of brittle quartzose ore per hour with the consumption of 15 h. p. is probably sufficiently safe. The actual duty will be governed largely by the manner in which the crusher is fed, the proportion of fine ore in the stuff crushed, and upon whether or not the fines are screened out before feeding to the crusher. However, it is to be regretted that there is such a lack of accurate data as to these common machines, and especially such a lack of data as to the comparative hardness and toughness, breaking strength, friability and specific gravity of various ores. Such data with respect to the typical ores would be of great value to the metallurgist.

NEW COAL MINES IN FRANCE.—No less than 27 new shafts are now being sunk in France. It is estimated that when these shafts are completed, they will produce about 4,000,000 tons of coal annually.

RAILROADS IN WEST AFRICA.—The Gold Coast Railroad in West Africa is completed from the seaboard to Coomassie. The first train at Coomassie had the honor of carrying no less than four kings, the monarchs of Bakwai, Kokohi, Adansie and Abodom. Four kings are a pretty good hand, and ought to encourage investors in West African gold mines.

GERMAN IRON PRODUCTION.—The German Iron and Steel Union reports the output of the blast furnaces in Germany in August at 875,829 metric tons of pig iron; an increase of 138,993 tons over August, 1902. For the eight months ending August 31 the output was as follows, in metric tons:

	1902.	1903.	Changes.
Foundry iron	1,051,292	1,191,487	I. 140,195
Forge iron	797,580	585,933	I. 278,344
Steel pig		489,991	
Bessemer pig	260,787	290,754	I. 29,967
Thomas (basic) pig	3,346,874	4,117,539	I. 770,665
Totals	5,456,533	6,675,704	I. 1,219,171

Steel pig—reported separately this year, for the first time—includes spiegeleisen, ferromanganese, ferrosilicon and all similar alloys.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—The imports of fuel into Spain for the eight months ending August 31 were 1,309,349 metric tons of coal and 128,034 tons of coke. Exports of minerals are reported by the *Revista Minera* as below, in metric tons:

	1902.	1903.	Changes.
Iron ore	4,956,639	5,318,998	I. 362,359
Copper ore	647,905	755,355	I. 107,450
Zinc ore	59,169	84,589	I. 25,420
Lead ore	2,341	1,825	D. 516
Pyrites	312,600	380,380	I 67,780
Salt	183,713	227,806	I 44,093

Exports of metals were 31,500 tons pig iron, against 30,433 tons in 1902; 20,060 tons copper, against 18,230 tons; 1,346 tons spelter, against 1,201 tons; 107,823 tons lead, against 110,735 tons last year.

COST OF GOLD PRODUCTION IN WESTERN AUSTRALIA.—The following interesting table of working costs has been compiled by W. Sutherland, of the Golden Horseshoe Company. It is based upon the latest annual reports of the leading mines. The last year's total costs were as follows:

	Cost per ton.	Cost per oz. extracted.
Associated Northern	$32.44	$8.11
Oroya-Brownhill	24.43	11.52
Lake View Consols	18.15	14.87
Golden Horseshoe	16.81	9.74
Kalgurli	16.47	14.65
Boulder Main Reef	15.93	17.23
Great Boulder	13.14	8.21
Great Fingall	11.94	7.19
Westralia Mount Morgan	11.90	11.92
Cosmopolitan	11.60	13.20
Boulder Perseverance	10.96	7.93
Ivanhoe Gold Corporation	10.82	10.02

Under head of working expenditure are included development, diamond drilling, ore-reduction, depreciation, maintenance and management expenses, in fact all expenditure incurred in the State.

THE ALUMINUM FURNACE LITIGATION.

The long controversy that has been waged by the Electric Smelting & Aluminum Company and the Pittsburg Reduction Company over the rights to the process of manufacturing aluminum in the electric furnace, has reached another stage in its progress. A suit brought by the former company, as appellant, before the United States Circuit Court of Appeals, sitting in New York, has been decided in its favor, and a decree entered for an injunction and an accounting against the Pittsburg Reduction Company. This decision was handed down by Judge Coxe, and is regarded as an important step towards the final settlement of the litigation. By its decree the Court upholds the validity of the Bradley patent (No. 468,148), now owned by the Electric Smelting & Aluminum Company, while it declares that the Hall process, under which the Pittsburg Company operates, is an infringement of that patent.

The Bradley patent was applied for in 1883, but it was not granted until many years later, and does not expire until February, 1909. It is of very broad nature, covering the process of "separating or dissociating aluminum from its ores or compounds, consisting in fusing and maintaining the fusion and electrolytically decomposing the ore or compound by the passage of the electric current there through," as well as the recovery of other metals in the electric furnace. One of the principal features of the process is that it dispenses with the external application of heat to the ore, the state of fusion being maintained by the heat developed by the passage of the electric current. The Hall patent was issued in 1889 for improvements in the "process of reducing aluminum by electrolysis" and specified that fusion was produced by external heat. It is claimed that the Pittsburg Reduction Company subsequently abandoned the Hall type of furnace and adopted the Bradley method of internal electric heating. In its decision the Court discusses at some length the salient features of the Bradley and the Hall patents which are of general interest.

"Speaking generally, it is thought that most of the points of variance relied on can be traced directly to the improvement introduced by Hall, namely, the use of cryolite as a solvent for alumina. Were it not for this change it is hardly probable that infringement would be denied. But the change of materials does not create a new process but a new way of working the old process.

"Hall starts by fusing cryolite and maintaining fusion by the means of electric current; so does Bradley; at least in the example given in the patent, cryolite is the ore mentioned. If no other ore were added by Hall, the processes up to this point would be identical. But Hall found that alumina, which is just as much an ore of aluminum as is cryolite, dissolves readily with cryolite as a solvent or flux, and he was thus enabled to produce a more efficient and cheaper electrolyte.

"The Bradley process is not confined to cryolite or alumina; it relates to all ores or compounds of aluminum and all other refractory ores of like type. . . . The process may be used with cryolite alone, or alumina alone, or with both together, whether applied synchronically or successively. In either case the essential features of the process are appropriated.

"It is asserted that the Bradley process is not operative. Having found that the defendant is using the process, and it appearing that the annual output of its works is now over 7,000,000 lbs. it seems unnecessary to enter upon an extended discussion of this proposition. There is, however, ample proof that the patented process, when practiced experimentally, produced aluminum and there is also proof that practically the same process was commercially operated for short periods both in this country and in Europe."

LARGE IRON CASTINGS.—The largest iron castings ever made in the United States, or, it is claimed, in any other country, were recently made by

the William Todd Company, of Youngstown, O. These castings were bed-plates for engines built by that company for the Lackawanna Steel Company, of Buffalo. The larger one was 33 ft. 5 in. long by 12 ft. 1 in. wide, and weighed, when cleaned, 168,000 lb. The smaller casting weighed 140,000 lb. The bottom of the molds was made in loam, and the sides and cope in dry sand. The cope was in two sections. In pouring for the larger casting the mold was gated in five places; in one, a 35-ton tank was poured; in the second, a 25-ton ladle; the third, a 13-ton ladle; the fourth, a 10-ton ladle; the fifth, a 6-ton ladle. The metal was poured without any accident, and the casting came out in fine condition.

LITHOGRAPHIC STONE IN GREECE.

About eight months since a quarry of lithographic stone was opened in Greece by the discoverer, Mr. N. An. Meletopoulo, in connection with Messrs. Ar. D. Tsoukalas & Co., of Athens. This quarry is situated at Vryssia, in a range of hills which extends from north to south, and to the west forms the valley of Pharsalia, in Thessaly. Pharsalia is the railway station, about 10 km. from the quarry, the two points being connected by a well-kept carriage road. From Pharsalia the stone is shipped by rail to Volo harbor for market.

The quarry covers an area of over 2,000 hectares, and, so far, 13 well-defined beds of good stone from 1 to 8 m. thick, mostly gray in color, have been encountered. Production is momentarily limited by the inadequate facilities for quarrying and dressing the stone. Sample shipments, however, have been made to Paris, Trieste, Milan, Zurich, Berlin and New York, and tests made by lithographers show the stone to be of good quality, comparing favorably with the better grades from Bavaria. The samples from Greece did not average over 21 by 28 in. in size, but it is said that stones measuring 32 by 44 in., 34 by 48 in. and larger can be produced, when the necessary machinery, already ordered in Germany, has been installed. Heretofore, the stones have been cut and polished at Athens, blocks for this purpose being shipped from the quarry 35 by 50 in. in size, and from 8 to 15 in. thick. There is always more or less waste in dressing the stone, which makes it necessary to quarry a block larger than the size to be marketed.

In Greece labor is generally cheap. It is estimated that lithographic stone of marketable size can be extracted at a cost not exceeding $3.50 per cubic meter; the transport to Volo costs $4, and adding other expenses makes the entire cost of producing and shipping the stone $10 per cubic meter. The market value of lithographic stone depends upon size and quality, the highest price being paid for stones 34 by 48 in. or larger in dimension, and gray or white in color.

A RUSSIAN COAL SYNDICATE.—The leading collieries in the Domborowa District, in Poland, have formed a syndicate, the object of which is to regulate shipments and to maintain prices.

COLUMBITE.—Mr. F. E. Clotten, of Frankfurt, Germany, informs us that he needs a quantity—from two to three tons—of columbite, containing from 30 to 60 per cent Ta_2O_5. He would like to receive samples of the mineral.

ACETYLENE GAS FOR THE BLOWPIPE.—The use of acetylene gas in the blowpipe, according to an article by M. André Binét in *Le Genie Civil,* has many advantageous features. Of these not the least is the very high temperatures which can be obtained. The heat is not absolutely known, but is in the neighborhood of 4,000°, and in any event much higher than the oxhydrogen blowpipe is capable of. Oxygen is used in connection with acetylene.

ABSTRACTS OF OFFICIAL REPORTS.

Philadelphia & Reading Coal & Iron Company.

This company operates the anthracite coal properties controlled by the Reading Company, which holds the stock of the Coal & Iron Company, as well as that of the Philadelphia & Reading Railroad Company. These properties are nearly all in the Schuylkill region of the anthracite country.

The total coal mined from the company's estate is reported as follows, in long tons:

	1902.	1903.		Changes.
Mined by Company	6,968,565	6,299,449	D.	669,116
Mined by tenants	1,229,709	1,283,530	I.	53,821
Total	8,198,274	7,582,979	D.	615,295

The decrease in the total was 7.5 per cent. The decrease in production of the whole anthracite region for year ended June 30, 1903, was about 1.3 per cent, as compared with the year ended June 30, 1902.

The decrease in the production of the whole region resulted from the continuation of the strike of the miners, which was ordered by the United Mine Workers of America on May 12, 1902, and continued until October 23, 1902, when the miners resumed work, all questions at issue between the miners and operators being submitted for adjustment to the Anthracite Coal Strike Commission,

The account of coal handled by the company for the year is as follows:

	1902.	1903.		Changes.
Coal mined	6,968,565	6,299,449	D.	669,116
Coal purchased	1,034,290	1,008,252	D.	26,038
Stock carried over	397,934	109,961	D.	287,073
Total	8,399,789	7,417,662	D.	982,227
Coal sold	8,289,928	6,842,537	D.	1,447,391
Stock at close of year	109,961	575,125	I.	465,164

The decrease in sales was 17.5 per cent. The average cost of coal mined and purchased for the year was $2.188 per ton, which was 16c. per ton higher than in the previous year.

The total sum charged to expenses for colliery improvements, etc., for the past fiscal year was $867,329, as against $863,428 for the previous year.

There were $98,500 in mortgage bonds exchanged during the year for collateral sinking fund bonds of the Reading Company.

The income account for the year may be stated as follows:

Coal sales	$22,793,812
Rents and lands	332,886
Miscellaneous	152,542
Coal added to stock	745,245
Total receipts	$24,024,485
Mining and purchases of coal	14,771,145
Transportation and handling of coal	3,988,917
Taxes, repairs and damages	277,355
Colliery improvements	867,330
Coal land depletion fund	340,446
General expenses, etc	1,048,965
Total expenses	21,294,158
Net receipts	$2,730,327
Fixed charges and taxes	377,748
Balance	$2,352,579

To this balance is to be added the sum of $652,116, balance of profit from previous year, making a total of $3,004,695. Interest, at 2 per cent, on the debt due the Reading Company, amounted to $1,582,334, leaving $1,422,361 to credit of profit and loss account. The income statement given differs somewhat in form from that given in the report, but, it is believed, expresses the result more clearly.

The net receipts show an increase of $1,605,220 over those of the preceding year, the gain being due to reduction in expenses.

The report says: "In pursuance of the policy of the company to make reasonable provision against the depletion of its estate, there was set aside out of the revenue the sum of $340,445, being 5c. per ton on all coal mined from the company's lands during the current fiscal year. This sum has been used in the purchase of securities, and the total amount now in this fund, including the cash, is $2,030,757.

"The work on the new shafts referred to in the last annual report was considerably delayed in consequence of the miners' strike, but it is now being prosecuted vigorously, and will be continued during the coming year."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

London and West Country Chamber of Mines: Records for 1901-1903. London; published by the Chamber. Pages, 195.

The Designing and Equipment of Blast Furnaces. By John L. Stevenson. London, England; published by the author. Pages, 124; illustrated.

Annual Report of the Register of the United States Treasury. Judson W. Lyons, Register. Washington; Government Printing Office. Pages, 32.

Leitfaden für Eisenhütten Laboratorien. By A. Ledebur. Braunschweig, Germany; F. Vieweg & Sohn. Pages, 136; illustrated. Price (in New York), $1.60.

Report on the Mining Industry of Natal. 1902. By C. J. Gray, Commissioner of Mines. Pietermaritzburg, Natal; Public Printer. Pages, 84; with maps and illustrations.

Uses of Peat and Its Occurrence in New York. By Heinrich Ries. Albany, N. Y.; the University of the State of New York. Pages, 36; illustrated. Price, 10 cents.

Notes on Electric Railway Economics and Preliminary Engineering. By W. C. Gotshall. New York; the McGraw Publishing Company. Pages, 258; illustrated. Price, $2.

In Search of a Siberian Klondike. Narrated by Washington B. Vanderlip, the chief actor, and set forth by Homer B. Hulbert. New York; the Century Company. Pages, 324; illustrated. Price, $2.

Western Australia. Statistical Register for 1902. *Part II., Public Finance. Part IV., Interchange Part V., Land and Agriculture.* Compiled in the State Statistical Office. Perth, W. A.; Government Printer.

Oil, Gas and Glass: Chemical Industries and Minerals of Kansas. By G. P. Grimsby, State Geologist. Prepared for the State Department of Labor and Industry. Topeka, Kan.; State Printer. Pages, 32; illustrated.

Elektrometallurgie. Die Gewinnung der Metalle unter Vermittlung des Elektrischer Stromes. Second Part. By Dr. W. Borchers. Leipzig, Germany; S. Hirzel. Pages, 296; illustrated. Price (in New York), $3.75.

Transactions of the Civil and Mechanical Engineers' Society. Forty-fourth Session, 1902-1903. Edited by A. S. E. Ackermann, Honorary Secretary, London, England; published by the Society. Pages, 84; illustrated.

BOOKS REVIEWED.

Report of the Bureau of Mines of the Department of Internal Affairs of Pennsylvania, 1902. James E. Roderick, Chief of Bureau. Harrisburg, Pa.; State Printer. Pages, 960; illustrated.

This report follows, in its general scope and arrangement of topics, those that have recently preceded it. It contains the laws (some good, some bad) governing the mining of anthracite and bituminous coal in Pennsylvania, some recommendations and suggestions as to accidents, ventilation, and the inspection of mines, a summarized account of the great anthracite miners' strike, a detailed report on the Rolling Mill mine explosion that cost 112 lives, and the usual reports from the inspectors of the several anthracite and bituminous districts. The inspectors' reports are summarized in somewhat better fashion

than they have been, and are, to this extent, of more value. This does not imply, of course, that the statistics are more accurate, since it is an open secret that some of the figures given in the tables are a little better than guesses, particularly those giving the total amount of water handled at different anthracite collieries, and the total amount of coal used as fuel. The reason for this inaccuracy in the last case is that many boiler plants are supplied with coal fed by conveyors or 'scraper-lines,' as they are called locally, and, of course, the amount of the coal consumed, as returned by the mine inspector, simply represents a guess of some surface superintendent. Still, notwithstanding such inaccuracies, the report of the Pennsylvania Bureau of Mines has long been a publication of interest from the great mass of information it contains, and if the inspectors appointed under the new mine law are as efficient as their predecessors, the reports should be of equal value in the future.

Mr. Roderick calls attention to some of the defects of the present law, particularly in its arbitrary arrangement of mining districts without regard to the number of employers or to the tonnage of coal produced in each, and the impossibility obeying that section of the law which requires each anthracite inspector to visit each working face in the mines of his district once in 60 days. Mr. Roderick again protests against the use of electricity in any form in quarry mines. This recommendation seems rather drastic, since electricity is used in many foreign mines that are gaseous, yet without accidents resulting. The Pennsylvania legislature may well prohibit the use of electricity in quarry workings without forbidding its use underground altogether.

The Mineral Industry: Its Statistics, Technology and Trade for 1902. *Volume XI.*, 1903. New York and London; The ENGINEERING AND MINING JOURNAL. Pages, 890; illustrated. Price, $5.

The present volume of this annual, the eleventh of the series, conforms in plan and scope with the preceding volumes, which have been received with so much favor by engineers and technologists the world over. The uniform excellence of these volumes, as manifested in the accurate, timely and comprehensive treatment accorded to the various departments of mining and metallurgy, is a worthy tribute to the late R. P. Rothwell, who conceived and formulated the plans upon which the publication was carried forward. The increasing magnitude of the task to which Mr. Rothwell dedicated 'The Mineral Industry' will be readily appreciated after a consideration of the enormous development which the fields of mining and metallurgy have undergone in recent years. As a measure of this progress it may be stated that the value of the minerals and metals produced in the United States has increased two and one-half times in the brief period covered by this publication, and is now close to $1,500,000,000. The present volume has been carefully edited by Dr. Joseph Struthers, who was associated with Mr. Rothwell in the preparation of Vols. IX. and X.

In the list of contributors to Volume XI. are found many of the leading authorities in their various lines of research. Evidently it has been the aim of the editor to avail himself of the views and experience of men who are actively engaged in scientific or industrial pursuits. By this means, also, the volume becomes valuable, not only for its carefully prepared digest of literature, but as a timely work of reference, that may be consulted for all that relates to the most recent developments in mining and technology.

Passing over the introductory portion, in which are summarized the statistics of production of minerals, metals and secondary products in the United States in 1902, the first subject which receives attention is aluminum and alum. Under the caption are included statistical and general information concerning alum, aluminum, aluminum sulphate, bauxite, cryolite, corundum and emery, besides several papers on special topics. Dr. Joseph Hyde Pratt contributes a review of the progress of the corundum and emery industry in 1902; B. A. C. Craig writes upon the latest developments in corundum mining in Canada; and Leverett S. Ropes describes the recently discovered corundum deposits of Montana. The paper on 'Progress in the Aluminum Industry in 1902,' by John B. C. Kershaw, contains a valuable summary of the conditions obtaining in aluminum manufacture, both in the United States and foreign countries.

The following chapters on ammonia and ammonium sulphate, antimony, arsenic and asbestos are comprehensive, and are replete with information relating to the production, commercial movement, consumption, new discoveries and technology of these substances.

In the section devoted to asphaltum the usual statistics and reviews are supplemented by descriptions of the asphalt deposits of Kentucky, by William Burk, and of the asphalt resources of Cuba, by H. C. Brown. The paper on 'Petroleum and Maltha Products Used in the Paving Industry,' by A. W. Dow, is a noteworthy contribution to a subject, concerning which very little information has hitherto been published.

The subjects of barytes, bismuth, borax, bromine, calcium carbide, acetylene and carborundum require no special comment, but the chapter on cement is one that will be read with much interest. The manufacture of portland cement in the United States has grown at a rate that scarcely finds parallel in any other branch of the manufacturing industry, the output having increased 20-fold in a period of eight years. A paper on 'The Mechanical Equipment of a Modern Portland Cement Plant,' by Frederick H. Lewis, reveals the secret of this wonderful progress which has been achieved in spite of severe foreign competition. There are numerous illustrations showing the mechanical installation of typical modern plants. In addition to this monograph, the chapter includes a general review of the cement industry during 1902, by Dr. Charles F. McKenna, and an account of the manufacture of slag cement and slag brick, by Edwin C. Eckel.

Under coal and coke, space is given to full statistics of production in all the countries of the world, and to reviews of the trade in the United States. The able monograph on 'The Manufacture of Coke in the United States,' by Dr. F. Schniewind, which appeared in the preceding volume, is supplemented with a paper on 'By-Product Coke Ovens' from the same authority. The review of recent developments in the anthracite coal trade contributed by Samuel Sanford gives a clear and impartial account of the eventful history of this industry during the last few years, or since the period covered by Mr. Rothwell's article which appeared in 'The Mineral Industry,' Volume IV.

The chapter on copper has been prepared with the assistance of Dr. James Douglas, Walter Harvey Weed and Wilbur C. Knight, who review mining progress in the United States, and of James W. Malcolmson, Giovanni Aichino and Samuel S. Fowler, who contribute to the pages relating to the industry in foreign countries. Under the sub-head of copper metallurgy, which receives very full treatment, there are special articles (illustrated) by W. H. Freeland, W. H. Aldridge, Henry A. Mather, E. P. Mathewson and Dr. Edward D. Peters. The papers on electrolytic refining of copper, which have been a feature of recent volumes, are brought up to date by a review of the industry in 1902, by Titus Ulke. Two tables giving lists of the electrolytic refineries in the United States and Europe, with information as to the kind of material handled and daily output, are incorporated in the article. The home and foreign markets for this metal are treated in detail.

The important topics of electrochemistry and electrometallurgy are handled by John B. C. Kershaw. After discussing the present status of the electrolytic alkali industries in Europe and America, the writer gives a brief summary of recent developments in the electrometallurgy of antimony, arsenic, iron, lead, magnesium, nickel, tin and zinc, as well as in the manufacture of non-metallic compounds, such as calcium carbide, carborundum, chlorates, glass, etc. In view of the rapid progress that is being made in this branch of technology, the paper should be consulted by all chemists and metallurgists, who aim to be abreast of the times.

The chapter on gold and silver, which, it may be noticed, is the longest in the book, presents in the opening paragraphs full statistics of the production, commercial movement and coinage of the precious metals in the different countries of the world. In the following pages, reviewing the progress of mining, there are contributions from W. H. Weed, Wilbur C. Knight, Samuel S. Fowler, James W. Malcolmson and F. Danvers Power. The part relating to gold and silver metallurgy contains a monograph (illustrated) on 'Progress in Gold Milling During 1902,' by Prof. R. H. Richards, and an exhaustive review of the cyanide process in 1902 by Charles H. Fulton. The important metallurgical topic of treatment of sulpho-telluride ores by the bromo-cyanide process is discussed by Philip Argall, while W. A. Prichard and H. C. Hoover contribute an account of the process as used in the Kalgoorlie district of Western Australia.

The section dealing with graphite has been prepared with much care, judging from the detailed statistics and information furnished relative to the production of this mineral in the different countries. To the review of the industry in the United States there is appended a list of the principal manufacturers of graphite articles, which will be of value to all concerned in the trade. The deposits of graphite in Canada, which have lately come into prominence, are described by W. E. H. Carter.

The long section devoted to the iron and steel industries has been prepared by Frederick Hobart. In the first pages, the production and consumption of iron ore, pig iron and steel are shown by complete statistics down to 1902. The iron and steel production of the world to the same date is also discussed. The markets in the most important centers of the industry are written up in considerable detail with the assistance of L. W. Friedman, George H. Cushing and S. F. Luty. Under 'Progress of Iron and Steel Metallurgy During 1902' there are interesting paragraphs dealing with the possibilities of the electric furnace for the reduction of iron ores, the manufacture of steel direct from ores and the utilization of blast-furnace gases.

The subject of lead has been handled in a manner that is commensurate with its importance. The latest developments in the principal centers of the lead mining industry are described in detail; the notes relating to Canada being furnished by Samuel S. Fowler and those relating to Mexico by James W. Malcolmson. Under the sub-head of lead pigments, Parker C. McIlhiney contributes a paper on 'Progress in the Manufacture of White Lead During 1902.' The subject of lead smelting has been handled by Prof. H. O. Hofman in a very satisfactory manner.

Under nickel and cobalt, A. McCharles reviews recent events in the nickel industry of the United States and Canada, and F. Danvers Power contributes notes on the latest developments in New Caledonia. The portion relating to the metallurgy of nickel has been prepared by Titus Ulke.

The phenomenal developments in the petroleum industry in California and Texas are fully described in this volume. There are also detailed statistics of the production, imports and exports of petroleum, covering the United States and foreign countries, as well as other information relating to the general progress of the industry. The portion of the chapter relating to petroleum in foreign countries has been prepared by Paul Dvorkovitz.

The subject of quicksilver is handled in a comprehensive manner, the statistics of production and of commercial movements being supplemented by reviews of progress in the principal mining centers and by descriptions of recent developments in metallurgy. The new Spirek furnace for the roasting of quicksilver ores, which is being introduced into the United States, is described and illustrated by drawings.

The chapter on rare elements, prepared by W. J. Huddle, contains much that is interesting, as might

be expected from the many discoveries that have resulted from recent investigations of the properties of the rare earths. It gives an abbreviated, but clear, account of what has been learned regarding radium, polonium, thorium and the other radio-active elements. There are also short paragraphs dealing with recent experiments in the chemistry of cerium, germanium, iridium, and other elements.

Under sulphur and pyrites are included complete statistics of production and reviews of the mining industry in the United States and foreign countries. W. H. Adams furnishes notes on pyrites mining in New York and Tennessee, while Frederick J. Falding reviews the progress in the sulphuric acid industry during 1902. Mr. Falding's paper is supplementary to the exhaustive series of articles on the manufacture of sulphuric acid, which appeared in previous volumes of 'The Mineral Industry.'

The subject of tin is comprehensively treated from a mining and statistical standpoint. Among the reviews relating to tin mining, those dealing with Bolivia and the Malay States are especially satisfactory, and have been contributed by J. B. Minchin and R. A. F. Penrose, Jr. Under technology, H. A. Mather gives some interesting information regarding the utilization of tin dross and the manufacture of solder. The New York and London tin markets in 1902 are reviewed in detail.

The chapter on zinc and cadmium compares favorably, as regards completeness of treatment, with the chapters dealing with the other metals. The portion relating to metallurgy has been handled by Walter Renton Ingalls, which fact is a sufficient guarantee of its value. There are paragraphs dealing with the subjects of blende roasting, distillation furnaces, retorts and refining furnaces, and more extended reviews of recent developments in the hydrometallurgy and electrometallurgy of zinc. The progress in the zinc industry in Missouri during the year is described by Frank Nicholson, the article being illustrated with drawings of the latest machinery in use in that district.

As a supplement to Volume XI., there have been included several monographs which could not well be placed under the preceding subjects. The first of these is a review of the general literature on ore deposits during 1901 and 1902, from the pen of Prof. J. F. Kemp. The past year has been so fruitful in discussion of methods of classification and theories of origin of ore-bodies that Prof. Kemp's paper will be read with profit by all mining engineers and geologists who follow the evolution of this interesting line of research.

The monograph 'Review of the Literature of Ore Dressing in 1902,' by Prof. R. H. Richards, has been carefully prepared, and covers the whole subject in a thorough manner. All the latest devices in crushing, concentrating and sampling machinery are briefly mentioned, and, where necessary, illustrated by drawings. Portions of the paper are devoted to general milling practice, tin dressing, magnetic concentration, oil concentration and coal washing.

The papers on metallography, which have appeared in the previous volumes of 'The Mineral Industry,' have proved an attractive feature. The present installment on 'Progress of Metallography in 1902' is fully up to the standard of the preceding contributions, and is profusely illustrated by reproductions of photographs. The author of this monograph is William Campbell.

Under the subject of alloy steels, John A. Mathews describes the present state of our knowledge of the character and constitution of the important varieties of steel. Among the topics discussed in the paper are the chemical constitution of alloys, general properties of iron alloys, electrical conductivity of steel alloys, 'high-speed' steels and special properties of alloys of iron with silicon, phosphorus, vanadium, manganese, titanium, copper, etc. Further details regarding the use of titanium for alloying with iron and steel are given in a separate paper by A. J. Rossi.

The monograph on 'Ore Sampling,' by T. A. Rickard, illuminates a subject that has not received the attention it deserves in technical literature. Correct methods of sampling and estimating ore in a mine are of vital importance to the mining engineer, but there is a lamentable dearth of information concerning the accepted practice among the leading representatives of the profession. The monograph in this volume will find appreciative readers, coming as it does from one who has been actively engaged in this branch of mining engineering and who is thoroughly familiar with the problems involved. Illustrations are included, whenever they may add interest or clearness to the text.

In the preceding paragraphs it has been possible to give only a bare outline of the most salient features of Volume XI.; many important subjects have been passed without mention, although they are handled with thoroughness, and materially increase the value of the book. In its general form, binding and typography, the volume is similar to its predecessors.

N. H. D.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Mexican Taxes on Bullion.

Sir.—Referring to the editorial on "Mexican Taxes on Bullion" in the JOURNAL for September 12, not all the Mexican States impose the "2 per cent export tax," with its attendant 25 per cent. Federal tax on this 2 per cent. Jalisco has no such tax. The State of Guanajuato imposes this 2 per cent tax, whether the gold and silver be in bullion or in ore.

In the value given for a kilo of silver—$40.195—it should have been written $40.915.

WILLIAM N. CUMMINGS.

Guadalajara, Mexico, Oct. 12, 1903.

Placer Mining in Colombia.

Sir.—It may be of interest to the readers of the JOURNAL to learn some facts concerning the placer resources of the Antioquia Department of Colombia, in South America. Few know the richness and extent of the deposits which cover most of the Nechi river valley from its junction with the Cauca river south to where it joins the river Porci. These deposits vary in thickness from 12 to 35 ft., and carry a gold value of from 65c. to $1.25 per cu. yd. The gold is all coarse, there being no float.

A claim in Antioquia consists of 9 square miles, from which a simple calculation will show the amount contained in a single claim, of the values stated above. The companies at present actually producing are the San Carlos on the river Lliano, a tributary of the Nechi; and the Santa Barbara. Within the next few months the Santa Margarita, El Cordero, the Rio Nechi Mining Company, and La Quebra, will be mining with two monitors each. These are the pioneer companies, which are opening to the view of the mining world the possibilities of Antioquia.

It is but just to state, in this connection, that the existence of the above companies has been made possible by the persevering work of Mr. Isidore Davidov, of New York. He came here four years ago, shortly before the recent revolution, and in a few months following, in the face of great difficulties, succeeded in acquiring 21 different properties, including all of the above-mentioned companies with the single exception of San Carlos.

The method of mining here is both cheap and simple, as each property has sufficient water to work all the year round.

The longest ditch necessary in the entire district is only 3 miles; most of them are not more than 1½ miles. The expense of equipment for two monitors is not more than $13,000, and each mine can easily be made ready to produce within eight to ten months.

All the properties are accessible by river boats from Barranquilla. Labor is cheap and easily procured.

I believe, when capital becomes interested here, this department bids fair to make a remarkable showing.

JEROME M. COLMAN,

Zaragoza, Antioquia, Colombia, Sept. 28, 1903.

"Transport or Transportation."

Sir.—I have read your editorial on "Some Words and Their Ways," in the ENGINEERING AND MINING JOURNAL for October 24, and find much to comment on in your insistence on the proper use of certain terms, such as tunnel, adit, chute, and the like. More care in this respect is certainly needed, both by engineers who write, and by editors.

On one point, however, I must make a protest. In your paragraph on "transport" and "transportation," I think that you try to make general what is in reality only a special and local application of one of these words, and to do away with the use of a word which is in good and regular standing. Transportation, in England, may have the ugly penal meaning attached to it, to which you refer. In this country, where the banishment of criminals has never had place, the word was never used in that sense, and I doubt very much if any one would ever think of such a meaning, unless he were a Britisher. The word transportation, as applied to the movement of passengers and freight from place to place—and to that only—has been in use in this country for many years, and by the highest authorities. If you will refer to the reports and writings of such masters of language as the late General Albert Fink, Charles Francis Adams, formerly railroad commissioner of Massachusetts, the late vice-president Hobart and S. Wright Dunning, you will find "transportation" constantly used, and "transport" very seldom, if at all. The gentlemen referred to, I have named because they were not only distinguished students of railroad traffic, but also because it was largely due to their labors and their writings that "transportation" has been placed upon a really scientific basis.

In good American, we speak of the transportation of freight or of passengers, and "transport" sounds rather pedantic. The verb to transport is all right, of course, but the use of the noun transport is limited chiefly to a vessel employed in the transportation of troops or government supplies.

If we look elsewhere for analogy, we find that "transportation" is used in French in the American sense. "Voies de transportation"—ways (or roads) of transportation—is a good French expression covering all lines for carrying passengers and freight, as railroads, canals and rivers.

It seems to me that transportation is a good word, and it is hard that it should be barred out because at some previous period, and among a limited section of the English-speaking races, it had a special and unpleasant use, which was, after all, an entirely incorrect one—really a slang term. Certainly, the great majority of your readers are Americans; why deprive them of a good, sound American word which every one understands?

AMERICAN MINING ENGINEER.

New York, Oct. 26, 1903.

California Asphaltum.

Sir.—In referring to an article on "The California Asphaltum Industry," which appeared in your JOURNAL for October 3, I would say that the assertion that "the difference cannot be chemically expressed, nor has it strictly a scientific meaning," in regard to the difference between Eastern and California petroleums, is far from correct. Pennsylvania petroleum, for instance, consists for the most part of

hydrocarbons of the series C_nH_{2n+2}, up to $C_{28}H_{58}$ of polymethylenes C_nH_{2n}, from $C_{22}H_{44}$ to $C_{36}H_{72}$, and of di-cyclic polymethylenes C_nH_{2n-2}, containing 27 atoms of carbon or more. It also contains minute amounts of sulphur and nitrogen compounds, and a small proportion of benzol derivatives, and the lower polymethylenes, such as hexa-methylene.

Thanks to Professor Maybery, to whom we are indebted for the above facts, we also know the nature of the hydrocarbons occurring in Ohio and Canada petroleums. His researches also show us that in California petroleum, on the other hand, there is an almost, if not a total, absence of the C_nH_{2n+2} series, while much the larger part of the oil consists of polymethylenes of the C_nH_{2n}, C_nH_{2n-2}, and C_nH_{2n-4} series. The amount of aromatic hydrocarbons, benzol and its homologues, is much higher than in Eastern petroleum, as is that of the sulphur and nitrogen derivatives.

An excellent summary of Professor Mabery's investigations will be found in the *Proceedings* of the American Philosophical Society, Volume 42, No. 172.

It is stated that "some oils contain more water than others, which interferes greatly with the distillation, causing the oil to boil." It would appear that what is meant by this is that such oil foams on heating and is difficult to handle.

Again, it is stated that "Trinidad asphalt formed in this manner is about 60 per cent pure, a larger percentage than any of the California natural deposits, and contains 1.5 per cent of saline salts, which are deleterious to paving, as explained later; a small percentage of vegetable matter and the balance mud." It is difficult to understand where the writer obtained this information. Trinidad crude asphalt is mined, not "dipped," from the lake and contains only 39 per cent bitumen. On washing this asphalt with water, less than 0.5 per cent of soluble inorganic salts can be extracted, and it has never been proved that this minute amount of soluble material exercises any great effect upon the durability of this bitumen. There is no vegetable matter in the clean Trinidad lake asphalt, and certainly no mud. The mineral matter consists preponderatingly of extremely fine quartz grains and a small amount of clay.

Farther on the writer remarks that "beds, or strata, or shale, sandstone and sand have been saturated with petroleum and have been distilled by oxidation," etc. Distillation by oxidation is something quite new and not readily understood.

The description of the manufacture of asphaltum from natural deposits by the Alcatraz Paving Company is inaccurate. The writer states that "this company owns the largest deposit in the State, known as the Goleta beds, situated in Santa Barbara county." The large deposits owned by this company are the beds of bituminous sand in the Sisquoc hills, miles away from Goleta. Near Goleta there is an exhausted vein of asphalt, which was originally worked by the Alcatraz Paving Company, before they developed the Sisquoc beds, and which was known as the La Patera mine.

No pipe-line was ever constructed by the Alcatraz Paving Company in the neighborhood of Goleta. A line was built by this company from their deposits in the Sisquoc hills to the coast at Alcatraz Landing, 28 miles distant. The lighter distillates from crude California petroleum were prepared at Alcatraz Landing, and pumped through the pipe-line to the Sisquoc hills, where these distillates were used for extracting the bituminous sands. No crude oil was used for this purpose, as stated by the writer. The bitumen, in the state of solution, was then run to the coast by the pipe line, and the oil again recovered, leaving a residue of solid bitumen.

As to whether the product prepared at this point from a so-called natural asphalt was better than the residues from the distillation of crude oil, has never been determined.

There are numerous other inaccuracies of a minor nature in the article, but the writer in his final conclusions is correct, that no asphaltum can be made from the natural deposits of California at a cost which will permit of its being sold at a profit, in competition with other bitumens.

CLIFFORD RICHARDSON.

Long Island City, N. Y., Oct. 19, 1903.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON MAGNESIUM TIPS.—The goods in question are invoiced as "magnesium tips." They were assessed for duty at 35 per cent under paragraph 97 of the act of July 24, 1897, as articles composed of mineral substance, and are claimed alternatively to be dutiable as a chemical compound at 25 per cent under paragraph 3, or at 20 per cent as an unenumerated manufactured article under section 6 of said act.

They are imported in the shape of rods a few inches in length and about ⅛ in. in diamater, and are used for holding the mantles in position in so-called incandescent burners. An analysis shows that they are composed wholly of clay with a trace of oil, the latter acting as a binder. This material is selected because it will neither burn nor melt. It will be readily seen that the goods under consideration are entirely different from metallic magnesium, as they are shown by the reports of the chemist and the local appraiser to be non-metallic.

We find that the goods are manufactured articles, and that they are not provided for in the tariff schedules. We sustain the claim in the protest at 20 per cent under section 6, and reverse the decision of the collector. All other claims are overruled.—Appeal of Friedlander & Oliver from Collector of Customs at New York; Board of General Appraisers.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Rottenstone, Infusorial Earth and Tripoli.—Can you furnish me with the names of dealers in these minerals, and also state what they are used for?—P. H. W.

Answer.—As abrasive materials for polishing metals and finishing wood, rottenstone and infusorial earth are excellent. Infusorial earth is also used as a filter for oils. Tripoli or silicious earth, which closely resembles infusorial earth, or "fossil flour," and is frequently misnamed, is valued principally as a filter for liquids and as an ingredient for making blotting paper on account of its great absorptive power. Leading dealers in these substances are Hammill & Gillespie, 240 Front street, New York City; R. J. Waddell & Co., 52 Beekman street, New York City (rottenstone only), and John C. Wiarda & Co., Green and Provost streets, Brooklyn, N. Y.

Molybdenite.—I have found molybdenite on Lone Mountain, in Esmeralda county, about 14 miles from Tonopah, Nevada. What is it worth?—P. McK.

Answer.—In recent years there has sprung up a good demand for molybdenum steel, which possesses special qualities. Besides metallic molybdenum and ferro-molybdenum, other alloys are prepared for various purposes. The ore molybdenite is valued according to its content of the metal and purity; to be marketable it must carry over 45 per cent molybdenum, and be free from copper. When analyzing 50 to 55 per cent MO, the ore is worth approximately $300 per long ton. Metallic molybdenum, assaying 95 per cent and upward, is priced at $1.55 to $2 per pound, while ferro-molybdenum and other alloys sell proportionately, as to the tenor of their metallic contents. Purchasers of molybdenite are the Primos Chemical Company, Primos, Pa.; A. B. Frenzel, 1540 Sherman avenue, Denver, Colo., and Ash & Deininger, Phœnixville, Pa.

Compounds of Gold in Nature.—After careful inquiry I learn the remarkable fact that in all the volumes on gold and its combination, and in the separate volumes on specific gravities, there is no record of the specific gravity of sulphide of gold, oxide of gold, bromide of gold, and but one doubtful mention of chloride of gold. In view of the wild search for gold, one would suppose chemistry would be exhausted in ascertaining and determining every economic combination of gold with other elements, whether mechanical or chemical.

If you call attention to the fact, you may excite the ambition of chemists to determine these specific gravities and so associate their names in text books historically. This knowledge may also tend to increase the production of gold. Years passed before Cripple Creek furnished any gold, because over-wise chemists failed to detect the chemical combination involved.—J. C. R.

Answer.—The existence of oxide of gold is not known; the sulphide is stated to have been determined in one or two instances, as at Deep Creek in New South Wales, while the bromide and chloride are rarely found in nature, because the salts are easily decomposed. Gold occurs in workable form in the native state to such a preponderating degree that the unusual and unstable compounds of it receive but little attention. In regard to the statement concerning Cripple Creek, our correspondent is wrong; the tellurides were recognized in the very beginning of that mining district, as was to be expected in a region which had already developed two successful telluride districts, namely, Boulder county and the La Plata mountains. We endorse our correspondent's suggestion that chemists should realize that a valuable field for investigation lies open in the direction of these little-known compounds of gold.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

741,615. PROCESS OF MAKING ACETIC ACID.—Johann G. Behrens and August Behrens, Jr., Bremen, Germany. An improvement in manufacturing concentrated acetic acid, consisting in dissolving acetate of lime in concentrated acetic acid and decomposing it by means of sulphurous acid.

741,618. ART OF MAKING METAL CASTINGS.—William A. Bole, Pittsburg, Pa., assignor to the Westinghouse Machine Company. An improvement in making metal castings in sand molds, which consists in promoting approximately synchronous shrinkage of all portions of the metal by subjecting the sand which constitutes the mold, adjacent to different portions of the casting, to the cooling action of independently-regulated quantities of cooling fluid.

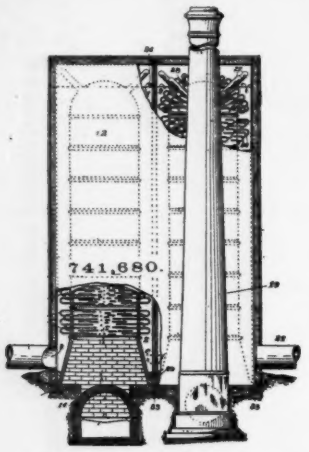
741,637. PROCESS OF EXTRACTING BROMINE FROM BRINE.—Herbert H. Dow, Midland, Mich., assignor to the Dow Chemical Company, Midland, Mich. The steps in the continuous process of manufacturing bromine from bromide-containing brimes which consist, in dividing the untreated brine into two parts, in oxidizing portions of such parts separately and simultaneously, and then subsequently oxidizing another portion of one part by the products of the oxidation of the first portion of the other part.

741,653. PROCESS OF TREATING LEAD, SILVER, OR ZINC ORES.—Solomon Ganelin, Berlin, Germany. A process for the treatment of ores and substances containing metallic oxides, particularly those of silver, lead or zinc, which consists in mixing said substances with a molten salt capable of dissolving the said oxides from the rest of the ore and then separating the metallic substances from said salt and the rest of the ore.

741,657. HOT-COKE CONVEYER.—Maurice Graham, Leeds, Eng. In apparatus for conveying and quenching incandescent hot coke, the combination, with an endless traveling conveyer working within an upper trough of a lower trough inclosing the return part of the conveyer, a series of pipes or passes connecting the said troughs, and

a series of hinged push-plates attached on both sides of the said conveyer.

741,680. HOT-BLAST STOVE.—Herbert Lang, Oakland, Cal. In a hot-blast stove or air-heating apparatus, a series of more than two adjacently-placed air-cells in communication alternately at top and bottom, an air-inlet to the first



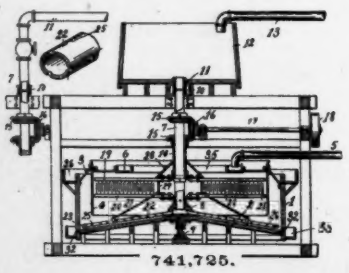
cell, an air-outlet from the last cell, a series of superimposed retort-sections forming a continuous tier in each cell all in communication at bottom, a heating furnace, and means for sending the products of combustion of said furnace into and out of all the said retorts in succession, in reverse direction to that of the air current through said cells.

741,702. ROLLING-MILL.—John W. Offutt, Ellwood City, Pa., assignor, by mesne assignments, to National Tube Company. In a rolling mill, the combination of two sets of rolls rotating in opposite directions, a mandrel bar and mandrel, and means for operating the same, and means for opening one set of rolls and simultaneously closing the other set.

741,708. PACK FOR ROLLING SHEET METAL.—Alexander Paterson, Wilkinsburg. Pa. A sheet-metal pack, comprising a sheet folded into layers disconnected along the sides and connected at the forward corner or corners only by portions forming integral parts of the original sheet.

741,712. PROCESS OF TREATING REFRACTORY ORES.—Edwin C. Pohle and Stuart Croasdale, Denver, Colo., assignors to Metal Volatilization Company, Philadelphia. A process which consists in effecting a mixture containing the ore, sulphur and a haloid of an alkaline or alkaline-earth metal, the relative proportions of the materials being substantially those quantitatively requisite to produce, when heated in the presence of oxygen, a haloid of the metal or metals to be extracted from the ore and a sulphate of of the alkaline or alkaline-earth metal; roasting the mixture with free access of air and agitation at a temperature sufficient to effect the reaction mentioned; and volatilizing and recovering the metal values as haloids or oxyhaloids.

741,725. CONCENTRATOR.—Emile Schultz, San Francisco, Cal. In combination, a tank having a conical bottom sloping outward and having in its side at the juncture with the bottom a small hole for the escape of concentrates, rota-



ting pipes also sloping downwardly outward in close proximity to the bottom of the tank, and having perforations for discharging water therefrom at the bottom of the tank, means for feeding water to said pipes and a shell within the tank having its lower edge raised above the bottom of the tank whereby the lighter material in escaping from the tank is compelled to pass below the lower edge of the shell and in close proximity to the bottom.

741,727. HIGH-TEMPERATURE FURNACE.—John T. Shadforth, Walker-on-Tyne, England. A furnace for producing a high-temperature reducing-flame, comprising a liquid-fuel-vaporizing chamber, a combustion chamber, water vessels arranged one on each side of the vaporizing and combustion chambers, as described, connections between said vessels and the combustion chamber, a main flume and a branch flue opening communication between the main flue and the combustion chamber.

741,751. CASTING METALS.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl and Patterson, Pittsburg, Pa. A method of casting pig metal, consisting in pouring the metal into traveling molds, partially submerging said molds but not the metal therein in water, and at the same time keeping the metal from contact with the water while in the molds and discharging the metal from the molds into water and completely submerging the metal therein.

741,752. APPARATUS FOR CASTING METALS.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl and Patterson, Pittsburg, Pa. In an apparatus for casting pig metal, the combination with a suitable frame, of wheels mounted thereon a longitudinal endless carrier passing around said wheels, rollers on said carrier, a water-trough, tracks located within and parallel to the sides of said trough upon which said rollers travel, a tank at the rear end of said carrier into which the pigs are discharged by the carrier, and a car within said tank adapted to catch the pigs as they are discharged by the carrier and to carry them from the tank.

741,769. ANTI-FOULING COATING FOR METAL STRUCTURES.—George D. Coleman, Boston, Mass., assignor, by mesne assignments, to Coleman Ship Coppering Company. An anti-fouling coating for metal structures composed of a layer of paint, a layer of finely-divided oiled vegetable substance and a layer of comminuted copper.

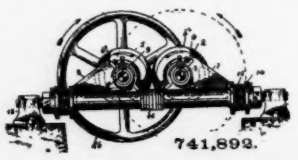
741,840. PROCESS OF EXTRACTING THE HEAVY METALS BY THE USE OF CHLORINE.—Joseph Savelsberg, Papenburg, Germany. A process of obtaining metals from their sulphur combinations in ores, mattes and the like, which consists in suspending the material in water, subjecting the solution to the action of chlorine in the presence of iron oxide, then treating the solution so obtained with air in the presence of more material, separating the solution from the insoluble contents and recovering the metal therefrom.

741,851. CHAIN FOR CONVEYERS, ELEVATORS, ETC.—Abram D. Swegle, Fayette, Mo., assignor of one-half to Daniel A. Swegle, Galesburg, Ill., and Isaac L. Swegle, Fairview, Ill.; Bertan B. Swegle administrator of said Daniel A. Swegle, deceased. A chain having a link comprising the cross-piece, two side pieces reflexed to embrace the cross-piece of the adjacent link, portions extending lengthwise of the chain, and a portion connecting the extremities of the portions.

741,852. STAMP MILL.—George Thomson, Elizabeth, N. J. A stamp, die, or the like, having a face composed of an alloy of copper, nickel and steel.

741,864. ELECTROLYTIC DECOMPOSITION OF ALKALINE SALTS.—Meyer Wildermann, London, England. A process of producing alkali amalgam and separating it to form alkali hydrate which consists in separating the decomposing-cell from the combining-cell by a deep mercury seal, depositing alkali metal by electrolysis upon the mercury in the decomposing-cell, forcing the amalgam from the surface of the mercury in the decomposing-cell deeply into the mercury in opposition to its buoyancy and under the rib of the seal, allowing the amalgam to rise by its buoyancy through the mercury in the combining-compartment and decomposing it on the surface of the mercury there by means of local action.

741,892. CRUSHING ROLLS.—Willis G. Dodd, San Francisco, Cal. In a roller crusher, the combination with the grinding rolls, of separated rods arranged in the same horizontal plane at each side of the rolls and between which



said rolls work, means at the respective ends of the rods for supporting the same, a pair of slidable bearing-brackets for each crushing roll, each of said brackets being sleeved upon a pair of rods, means for exerting an inward pressure upon said bearing-brackets and universal bearings carried by said brackets upon which the crushing rolls are suspended.

741,925. CASING OR DRIVE-PIPE SCREWER FOR WELL RIGS.—Robin S. Oiler, Los Angeles, Cal. An annular rim adapted to encircle a well casing, upright rollers inside said rim and forming a support therefor to prevent lateral displacement, means for detachably connecting said rim to a well casing, and means encircling the rim for rotating the same.

741,926. PUMP.—Clarence L. Parker, Los Angeles, Cal. In a pump, the combination with a barrel, and a standing valve and plunger therein, of a working valve, a hollow plunger-rod for operating the plunger, and a lifting rod connected to the standing valve and having frictional engagement with the plunger-rod to receive initial movement therefrom, and means for connecting the plunger-rod to the lifting-rod to permit their simultaneous withdrawal from the well.

741,968. MINER'S BLASTING SQUIB.—Thomas R. Jones, Wilkes-Barre, Pa. A miner's squib comprising a body portion and two matches connected thereto, said matches having different combustible properties.

742,018. REDUCING-FURNACE.—William W. Fyfe, London, England. In means for converting metallic oxides into metal, the combination of a smelting-hearth, a melting-pot, a connection between said hearth and said pot, and flues whereby the flame and products of combustion are led over the smelting-hearth and then under the same and then under said pot, the melted metal in said pot and said connection being kept out of direct contact with the flame and products of combustion.

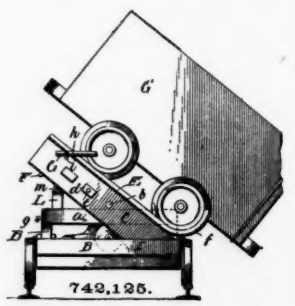
742,019. DEVICE FOR MAKING ARTIFICIAL STONE BLOCKS.—Howard G. Goodwin, Akron, Ohio. The combination with a series of bottom boards, of a guide-board arranged to be placed therein temporarily, of side pieces capable of being fastened together whose location on said bottom boards will be determined by said guide-board, and a filling-hopper to be placed on said side boards and means to locate the position of said filling-hopper with reference to said sides.

742,023. APPARATUS FOR LOADING OR UNLOADING VESSELS.—Beverly J. Harris, New Orleans, La. In a loading or unloading apparatus, the combination with a platform, of a frame and a motor mounted on said platform, a swinging frame pivoted to said frame, hanging frames pivotally connected to said swinging frame, idlers mounted in pairs in said frames, dumping-idlers mounted near the lower end of the lower hanging frame, and an endless looped apron passing between said idlers.

742,037. COKE-DRAWER.—William Kearns, Mammoth, Pa. A device comprising, in combination, a frame or casing designed to be extended into a coke-oven, means for gradually advancing the same, an endless conveyer, an incline extending from the end of the frame, a clawer for forcing the coke up such incline, and means for actuating such clawer.

742,109. MOLDING MATERIAL.—Paul Würtz, Hoboken, N. J. A composition of matter for molds for castings containing the substance commercially designated as "Keene cement," asbestos, infusorial earth and caput mortuum.

742,125. UNLOADING APPARATUS.—Charles P. Martin, Lemont Furnace, Pa., assignor of five-eighths to Charles H. Rhodes, Haydentown, Pa., and Lane Martin, Lemont



Furnace, Pa. In an unloading apparatus, the combination of a pivotally-mounted movable carrier heavier at the tilting end, and a spring for the purpose of returning said carrier to its normal horizontal position.

742,131. APPARATUS FOR ELECTRO-PLATING.—Charles T. Pratt, Frankfort, N. Y., assignor to Pratt Chuck Company, Frankfort. The combination in a plating apparatus of the bath-tank positive and negative electric conductors, a rack suspended in the tank, having upwardly-projecting, suitably-spaced anodes mounted thereon, and electrically connected with the positive conductor, and a metal plate electrically connected with the negative conductor, having nipple-receiving openings positioned to receive the anodes centrally therein, and supported above the anode-frame and intermediate of the height of the anodes.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending October 3, 1903.

19,351 of 1902. BRIQUETTE MAKING.—A Malden, London. Making briquettes of fine ores by adding borax to the clay or other binding material.

21,807 of 1902. BASIC FURNACE LINING.—W. J. Knox, Allegheny, U. S. A. Making a basic lining for metallurgical furnaces, consisting of a mixture of a basic material with any sulphide of iron, silicate of soda and calcium chloride.

23,639 of 1902. ROCK DRILL. W. Wilson, Cleator Moor. Forming percussive rock drills with a central opening to limit water so as to lay the dust.

23,771 of 1902. ROCK BREAKER.—E. Deane, Leeds. Improvements in the driving gear of rock breakers of the jaw-crusher type.

25,429 of 1902. MAGNESITE BRICK.—J. E. Kirkpatrick, Taunton, U. S. A. Making pure forms of magnesite into fire-bricks by burning and then molding with borax.

26,094 of 1902. BLAST-FURNACE CHARGING APPARATUS.—Beurather Maschmen Fabrik, Dusseldorf, Germany. Hydraulic apparatus for raising and lowering the cone of the charging hopper of blast furnace.

13,918 of 1903. BLAST-FURNACE CHARGING APPARATUS.—G. K. Hamfield and T. A. Tesch, Allegheny, U. S. A. Improved design for the charging apparatus of blast furnaces.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. R. J. Grant has returned to Denver.

Mr. Frank Klepetko has returned from Montana.

Mr. George Peirce, of Denver, is at Randsburg, California.

Mr. Forbes Rickard has returned to Denver from a trip to Idaho.

Dr. W. A. Hendry, of Los Angeles, Cal., has been visiting Spokane.

Mr. C. W. Pritchett has returned to Denver from a trip to Mexico.

Mr. Robert M. Raymond, manager of El Oro, is expected in New York.

Mr. A. H. Elftman, of Minneapolis, is visiting Hill City and Deadwood, S. D.

Mr. A. E. Reynolds and Mr. F. M. Woods, of Denver, are visiting New York.

Mr. A. Stanley Elmore is at Rossland, B. C., and is expected in New York shortly.

Mr. J. W. Anderson is now manager of the Lisbon-Berlyn mines, in the Transvaal.

Mr. Frederick T. Snyder, of Chicago, has been in New York during the past week.

Mr. Ross Hoffman was in New York early in the week and has returned to Denver.

Mr. E. W. Sebben, of Denver, is at present in Arkansas, examining zinc properties.

Mr. S. F. Emmons returned from Europe by the *Kronprinz Wilhelm* on October 28.

Mr. Frank Nicholson, of Joplin, is now examining the new zinc region in Wisconsin.

Mr. F. W. Bradley is at Tacoma, Wash., but expects to be in New York early in November.

Mr. C. C. Burger left New York for Denver last week, and is now on his way to Tonopah, Nevada.

Mr. Philip Argall has returned to Denver, after examining mines in the San Juan district, Colorado.

Mr. S. V. Newell, of Gilpin county, Colo., has gone to Chihuahua, Mexico, to examine mining properties.

Dr. E. R. Cummings has been appointed acting head of the Department of Geology at Indiana University.

Mr. W. E. Wainwright is manager of the Broken Hill South mine, at Broken Hill, New South Wales.

Mr. W. F. De Camp, who is engaged in mining in the Montezuma district of Sonora, Mexico, is in New York.

Mr. Alexander Hill, consulting engineer to the Le Roi No. 2, left Rossland, B. C., for London on October 19.

Mr. W. E. Defty, of Phœnix, Ariz., has been in Cochise county, that State, and is going to Sonora, Mexico.

Mr. C. A. Ross, of London, president of the Standard copper mine, near Clifton, Ariz., was at Clifton recently.

Mr. J. Parke Channing has gone to examine mining property in Nova Scotia. He will return about November 8.

Mr. H. A. Keller is now consulting metallurgist to the Messrs. Guggenheim and the Loomis-Pettibone Company.

Mr. T. H. Tracy is now general superintendent of the North American Copper Co., Encampment, Wyoming.

Mr. W. J. Stoneham, of Tonopah, Nev., met with an accident from which he is, we are glad to say, recovering.

Mr. George L. Reis, recently elected vice-president of the Lackawanna Steel Co., has also become general manager.

Mr. Henry C. Jenkins, late government metallurgist of Victoria, is now directing mining operations in Madagascar.

Mr. John Howell, formerly manager of the Broken Hill Proprietary, is expected in California on a visit from Australia.

Mr. H. H. Nicholson, of Denver, has returned from the Black Hills, S. Dak, and is in Clear Creek county, Colorado.

Messrs. Harry A. Lee and J. W. Finch, of Denver, have returned after spending several weeks in southwestern Colorado.

Mr. John E. Clennell is with the Redjang Lebong Mining Company in Sumatra. He will remain there two or three years.

Mr. George C. Hill, of Holyoke, Mass., president of the Shannon Copper Company of Clifton, Ariz., has returned to the mines.

Mr. Alfred Skeels, of the Orado Gold Mining Co., operating near Central City, Colo., has returned from a trip to Chicago and eastern points.

Mr. John MacGee is now at Puntas Arenas, on the Straits of Magellan. He is engaged in prospecting the southwest coast of Tierra del Fuego.

Mr. Charles S. Roberts, formerly secretary of the American Steel & Wire Co., has been elected president of the Weaver Coal & Coke Co., Chicago.

Mr. M. C. Shannon, of Birmingham, has been appointed chief chemist of the Alabama Wire & Steel Co., with headquarters at Gadsden, Alabama.

Mr. Deane P. Mitchell has arrived at Sydney, N. S. W., having left Auckland on September 21. He will represent Bewick, Moreing & Co., at Sydney.

Mr. W. H. Linley, former general manager of the De Lamar mines in Nevada, has accepted the position of manager of the Dewey properties at Pearl, Idaho.

Mr. H. E. Lawson, of Toronto, who has recently returned from West Africa, is visiting the principal cyanide plants in Colorado, Montana and South Dakota.

Mr. George W. Calles has resigned as chief engineer of Marion & Marion, Montreal, and has opened an office as consulting and mechanical engineer in Milwaukee, Wis.

Mr. George Weddell, master mechanic at the Washoe smelter, Anaconda, Mont., has resigned and will leave November 1 to accept a position with the Allis-Chalmers Company at Milwaukee, Wisconsin.

Mr. H. L. Webster, who has been chief mining superintendent of the Ashanti Goldfields Corporation's properties in Ashanti for three years, has returned from West Africa and is at Newtownbarry, Ireland.

A subscriber desires the present address of Jonathan Jordan, who was working a lease at White Hills, Ariz., in 1896. In the spring of that year he dropped down the Colorado river in a skiff to Yuma and disappeared.

Mr. Thomas T. Reed has recently been advanced to the position of associate professor of mining and metallurgy at the University of Wyoming, preparatory to the creation of a separate department of mining and metallurgy.

Mr. Daniel S. Johnson has just recovered from an attack of the Mexican fever. He was formerly with the American Smelting and Refining Co., at Aguas Calientes, but is now with the Pennsylvania Mining Co., at Grass Valley, Cal.

Prof. J. E. Todd, owing to dissatisfaction with the administration of the university, has resigned his position as professor of geology and mineralogy in the University of South Dakota, which he has held for over 11 years. He consequently also ceases to be State geologist.

OBITUARY.

Dr. Robert H. Thurston, director of the Sibley College of Engineering at Cornell University, died suddenly on October 25, his 64th birthday. Death was due to heart disease. Dr. Thurston was one of the best known members of the university faculty, and ranked very high in his profession. He was born at Providence, R. I., in 1839, and was graduated from Brown University. He served with distinction in the Engineering Corps of the navy during the civil war, and at its close was assigned to the faculty of the Annapolis Naval Academy. In 1871 he became professor of engineering at Stevens's Institute and in 1885 came to Cornell to take the directorship of Sibley College, then about to be organized.

Prof. Thurston invented improved testing machines and engine governors. He was the author of many engineering treatises, and was a member of several scientific societies in Europe and America. He was the first president of the American Society of Mechanical Engineers and served on many United States commissions.

INDUSTRIAL.

Four new Wilfley tables are being added to the equipment in the Quincy mills at Mason, Mich.

The open-hearth steel plant at the Pueblo works of the Colorado Fuel & Iron Co., is in operation. J. A. Durfee is superintendent.

The Colorado Iron Works has about completed the alterations on the mill it is erecting for the Hidden Fortune Mining Co. in Deadwood gulch, near Deadwood, South Dakota.

The Ingersoll-Sargeant Drill Co., of New York, has ordered 6 gondola cars of 100,000 lbs. capacity, from the Pressed Steel Car Co., Pittsburg. These cars are to be 40 ft. over end sills and 9 ft. 10 in. over side stakes equipped with wooden drop ends and Westinghouse draft rigging.

The Tennessee Coal, Iron & Railroad Co. recently has sent its fourth order for Cross oil filters to the Burt Manufacturing Co., of Akron, O. The Baldwin Locomotive Works, of Philadelphia, Pa., has just sent its thirteenth order for Burt exhaust heads to the Burt Manufacturing Co. The Baldwin Company now has 39 Burt exhaust heads in use in its plant.

A company has been organized to erect and operate the Ferris wheel during the St. Louis Exposition. The engineering work of taking down, transporting and erecting the wheel has been intrusted to Robert W. Hunt & Co., of Chicago. The cost is estimated at about $125,000. The work will be under the direction of L. V. Rice, who superintended the original erection of the wheel at the Columbian World's Fair.

The Westinghouse Machine Co., East Pittsburg, has recently put in operation a new foundry plant at Trafford City, Pa., at which it expects to make all the iron and brass casting required for the East Pittsburg works. As soon as the foundry is in full operation the one at East Pitstburg will be discontinued. The machine shop at the Walker plant, Cleveland, Ohio, will be removed to East Pittsburg.

Henry E. Knox, Jr., southern manager at Charlotte, N. C., for the Engineering Company of America, has been at the offices of the company in New York for several days. Mr. Knox makes a specialty of artesian wells and sub-surface water supplies. The company, under the direction of Mr. Knox, has just completed the installation of a water works system for the Belton Mills, at Belton, S. C. Similar plants are to be constructed by the company at Anderson and Greenville, N. C.

The Worthington Company is furnishing the city of Concord, N. H., with a triple expansion direct acting pump, with steam cylinders 9, 14 and 22 in. in diameter. The water ends, which are of the plunger and ring pattern, are provided with 12 5-in. plungers, the stroke being 18 in. The steam pressure is 100 lb., and the water pressure created by the pump is the same. The pump receives its water supply by gravity from the Merrimac river at a pressure of 50 lb., and pumps directly into a reservoir.

Among the orders received in the past fortnight by the various branch offices of the Crocker-Wheeler Co., of Ampere, N. J., one from the Lorain Steel Co., Lorain, O., received through the Pittsburg office, called for 41 motors ranging in size from 2½ to 360 h. p., and representing a total of 1,423 h. p. Another large order came from the New Jersey Zinc Co., of Hazard, Pa., through the New York office, for one 125 and two 600 k. w. generators, and 37 motors aggregating 401 h. p. The Philadelphia office placed an order from the Warren Foundry & Machine Co., of Phillipsburg, N. J., for one 200-k. w. generator, four 35-h. p. and two 60-h. p. motors, and through the Chicago office the G. H. Hammond Co. ordered for its packing plant at the Union Stock Yards, in that city, one 50, one 25 and two 20-h. p. motors, and an 800-k. w., 550-volt, size 896 engine-type generator. This last is a duplicate of one now building for the St. Louis Exposition, the entire intramural plant for which will be operated by generators supplied by the Crocker-Wheeler Co.

In the fertilizer trade the Stedman Foundry and Machine Works has sold disintegrators for grinding bones, tankage and general fertilizers to the Imperial Co., Norfolk, Va., two 36-in. disintegrators; L. Frank & Sons, Zanesville, O., one 40-in. disintegrator; Virginia-Carolina Chemical Co., Memphis, Tenn., one 40-in. disintegrator; Virginia-Carolina Chemical Co., Staunton, Va., one 36-in. disintegrator; Standard Guano and Chemical Co., New Orleans, La., two 44-in. and one 50-in. disintegrators; Ohio Farmers' Fertilizer Co., Columbus, O., one 50-in. disintegrator; Lackawanna Animal Product Co., one 40-in. disintegrator; Canton Fertilizer & Chemical Co., one 44-in. disintegrator; G. H. Hammond & Co., Chicago, Ill., two 44-in. disintegrators; Schwarzschild & Sulzberger Co., Chicago and Kansas City, two 44-in. disintegrators; Cudahy Packing Co., South Omaha, three 44-in. disintegrators; Nelson Morris & Co., Chicago, four 44-in. disintegrators; Armour & Co., Chicago, three 50-in. disintegrators; Swift & Co., Chicago, ten 50-in. disintegrators. Besides selling these concerns the disintegrators for their fertilizer plants the Stedman

works has sold mixers, screens and complete outfits for making commercial fertilizers.

During the past year the Stedman Foundry and Machine Works, of Aurora, Ind., has sold more disintegrators to the fertilizer, coal and coke and clay trades than ever before. Some of the recent plants for pulverizing coal to make coke using Stedman disintegrators are: Leewood Colliery Co., Leewood, W. Va., one 50-in. disintegrator; Kanawha & Hocking Coal & Iron Co., Harewood, W. Va., one 50-in. disintegrator; Carver Bros., Eagle, W. Va., one 50-in. disintegrator; Northern Coal and Coke Co., Norton, Va., one 30-in. disintegrator; the Briquette Co., New York, 1 30-in. disintegrator; Brown & Clifford, Norton, Va., one 44-in. disintegrator; Superior Improvement Co., Nazareth, Pa., one 40-in. disintegrator; Blackwood Coal & Coke Co., Blackwood, Va., 1 60-in. disintegrator; Utah Fuel Co., Sunnyside, Utah, two 60-in. disintegrators; New England Briquette Coal Co., Providence, R. I., one 44-in. disintegrator; Intermont Coal & Iron Co., Norton, Va., one 50-in. disintegrator; Norton Coal Co., Norton, Va., one 60-in. disintegrator; Wise Coal Co., Dorchester, Va., one 60-in. disintegrator; Colorado Fuel and Iron Co., Denver, Col., two 60-in. disintegrators; Stonegap Colliery Co., Norton, Va., one 60-in. disintegrator; Stonegap Coal & Coke Co., Stonegap Va., one 60-in. disintegrator.

At the Nimshew power house of the Valley Counties Power Co., a sub-company of the California Gas and Electric Corporation, the first two generators are in use. The power house is in Butte creek canyon, 24 miles from Chico. The available total head of water is 1,531 ft., taken down in one pipe line 6,200 ft. long, and tapering in three sections, from 30 to 28½ in. diameter. Within the power house the pipe terminates in a Y, each branch of the Y supplying a 3,700-h. p. waterwheel, the largest ones operated yet by a single jet of water. The generators are of the Stanley Electric Co.'s make, the rotary element mounted on the same shaft as the water-wheel; the generator is between the bearings and the water-wheel overhangs. Shaft and wheel disc are nickel steel forgings (the shaft being hollow forged and oil tempered), made by the Bethlehem Steel Co., and the buckets are steel castings of the patented ellipsoidal type. The total weight of the revolving part of each unit is over 40 tons; the speed 240 revolutions per minute. Each water-wheel is provided with a Doble patented needle regulating deflecting nozzle and hydraulically operated piston gate, a Lombard type D governor, with electric speed controller, taking care of the sudden fluctuations of the load by deflecting the nozzle, the regulating needle being operated by hand and set according to the average load of the respective hours of the day. The hydraulic machinery, including shaft, bearings and gates, was designed and built by the Abner Doble Co., of San Francisco.

TRADE CATALOGUES.

The Universal Drafting Machine Company, of Cleveland, O., sends out a little pamphlet of 16 pages, describing and illustrating its universal drafting machine. This device, consisting of a graduated square and protractor having an accurate parallel motion about the drawing-board, is claimed to facilitate greatly the work of a draftsman, enabling him to do 25 per cent more work within a given time. The machine is stated to be particularly well adapted for graphical statics.

The Capital Gas Engine Company, of Indianapolis, Ind., issues a little illustrated pamphlet of 24 pages describing its "Hoosier" gas engines. These engines are constructed on the principle of an impulse every revolution, instead of every other revolution, and are made in sizes from 2 to 5 h. p. Regulation is by an especially designed throttling governor, controlling the quantity instead of the quality of the explosive mixture. The engines are intended for running small pumps, electric-light dynamos, and for general power purposes. The company also makes a marine motor for launches.

Steel tanks and galvanized steel well casing and water pipe are described in catalogue No. 11, published by the Tallerday Steel Pipe & Tank Co., of Waterloo, Ia. The products of this concern have found a wide market and are found in many mining camps. The company states that it builds all shapes and sizes of tanks, and guarantees them to answer the purposes intended. The tanks can be shipped knocked down, the shipping weight being about 10 lbs. per bbl. capacity. The Tallerday water pipe is made of steel sheet from No. 14 to No. 22 gauge and in sizes from 3 to 24 in. in diameter. It is rolled in 10 ft. lengths and fitted with easily made connections.

"Steam Power Plants of the Pacific Coast" is the title of an illustrated pamphlet published by Chas. C. Moore & Company, of San Francisco, Cal. The pamphlet contains many handsome cuts, and briefly describes some of the work done by the firm within the past few years on the Pacific Coast and in the Hawaiian Islands. The company makes a specialty of power plant construction. It has acted as designing and constructing engineers for electric light and power companies for office buildings, dry dock companies, irrigation companies, cold-storage companies, cement works, etc. The pamphlet contains a list of the boilers, engines and mining machinery, including pumps, feed-water heaters and separators, valves, oiling systems, etc., that it considers of most worth.

A handsome catalogue is issued by the Kennedy Valve Manufacturing Co., manufacturers of valves, hydrants, etc., of 57 Beekman Street, New York City, with works at Coxsackie, N. Y. The catalogue contains 128 pages, and is printed on heavy coated paper. It is divided in sections. Section A describes and illustrates sectional views of the different types, and details of gate valves; section B describes and illustrates bronze gate valves; section C illustrates special hose valves and Siamese connections; section D is devoted to iron body bronze mounted and all iron gate valves and indicator devices for automatic sprinkler systems; section E is devoted to globe, angle, radiator and corner valves; section F is devoted to hydrants, extension valve boxes and floor stands. The catalogue will be sent upon request to interested parties mentioning this paper.

SOCIETIES AND TECHNICAL SCHOOLS.

SOCIETY OF CHEMICAL INDUSTRY, NEW YORK SECTION.—The first meeting of the season was held at the Chemists' Club on October 23. The chairman, Virgil Coblentz, made an address, and Dr. Ernest J. Lederle, health commissioner, delivered a lecture on 'Some Phases of the Work of the Department of Health.' Dr. Lederle's remarks were illustrated by lantern slides.

SPECIAL CORRESPONDENCE.

Butte. Oct. 23.

(*From Our Special Correspondent.*)

The Pittsburg & Montana Copper Co. has issued its ore purchasing circular No. 1. According to the circular, sulphide ores high in iron are sought. For an ore carrying 35% iron the company will take it at point of shipment and pay $2 per ton for the iron, 90% of gold and silver content, and 4c. per pound for copper off the prices given in the JOURNAL. The company has named the plant the Pittsmouth smelter.

Judge Clancy has rendered his decision in the case of Miles Finlan vs. F. Aug. Heinze in the Minnie Healey case. The judge found for the defendant, Heinze. The receiver case of John MacGinnis vs. the Boston & Montana Consolidated Copper & Silver Co., in which the plaintiff is seeking to restrain the defendant company from paying any dividends over to the Amalgamated Copper Co., the judge has taken under advisement, stating that he wanted to hear from the Supreme Court on certain points involved. The Supreme Court is expected to render its decision on the appeal case wherein T. H. Hinds is after his receivership fee of $200,000, granted him some years ago by Judge Clancy, when the latter appointed Hinds receiver of the Boston & Montana property, which receivership the Supreme Court vacated. For the five days Hinds was in charge Judge Clancy allowed him $200,000, which the company has not paid. MacGinniss, who is vice-president of the Montana Ore Purchasing Co., owns less than 100 shares of stock in the Boston & Montana, and has been fighting the merger of the Boston & Montana with the Amalgamated Copper Co. The case has just been before the court for the second time.

Orders have gone into effect to close all the Amalgamated properties, including mines, smelters, lumber mills and coal camps. This will have a great effect throughout the entire State, as a number of localities are wholly dependent upon the Amalgamated enterprises. While no reason is given out for the shutdown, it is understood that it is owing to adverse decisions by the courts of Silver Bow county. Probably 5,000 men will be out of jobs. How long this state of affairs will continue is hard to say, but as the orders for the shutdown seem to be general, it is not likely that resumption will take place very soon. The only properties not effected and which are still in operation are those of the United Copper Co., the W. A. Clark properties, the Pittsburg & Montana Copper Co., the Speculator, and a few lesser mines which are not of great moment.

It is rumored on the street that the miners employed by the United Copper Co. have had their wages raised to-day 50c. each, making the daily wage for miners $4. Several coal camps of the State will probably go out of business for the time being, especially those controlled by the Amalgamated Co.

(BY TELEGRAPH.)

Standing on the courthouse steps on October 26, Heinze made the following proposition, in answer to the committee from the Butte Miners' Union, at a mass meeting of the citizens and miners: "John MacGinnis purchased the 100 shares of stock he holds in the Boston & Montana Co. in April and May, 1898, at $200, per share. The cost of the stock in the Parrott company owned by MacGinnis and Lamm was about $35 per share. John MacGinnis was offered in 1899 and at several times subsequently $100,000 for the 100 shares of stock in the Boston & Montana Co. I understand the Butte Miners' Union to be willing now to pay as high as $50,000 for the Boston & Montana stock and $100 per share for the Parrott stock.

"I am authorized by Mr. MacGinnis and Mr. Lamm to state that they do not wish to make any money out of the sale of this stock, but, on the contrary, are willing to make a sacrifice, if a sale thereof will result to the benefit of the miners, laborers and business people of Silver Bow county and the State of Montana, and I am authorized by them to make the following offer, to wit:

"That John MacGinnis will sell the 100 shares of stock in the Boston & Montana Co. for $200 per share, or $20,000, with interest thereon from the date of the purchase at the rate of eight per cent per annum, and MacGinnis and Lamm will sell their shares of stock in the Parrott company for $35 per share, with interest on the amount at the rate of 8 per cent per annum from the date of the purchase of said stock, provided the judgments and orders now entered in the case of Forester and MacGinnis against the Boston & Montana Co., and the costs of the various actions with reference to this stock are paid and the whole controversy with reference to this stock and their rights as stockholders shall be forever settled; and provided, further, that the five undivided thirty-sixths of the Nipper lode claim owned by the Anaconda Copper Mining or the Amalgamated Copper Co. shall be sold and conveyed to me for the price paid therefor by the Anaconda Copper Mining Co. at the time it purchased the same and 8 per cent interest thereon from the date when the same was purchased, and the Anaconda Copper Mining Company and the Parrott Silver & Copper Co. shall give me a deed of conveyance, assuring title to all of the veins and ore bodies contained within the said Nipper lode claim and that the whole controversy with reference to the Nipper lode claim shall be for ever settled, so as to enable me to operate the Nipper property. This will put me in a position to give employment shortly to something over 500 men. And provided further, that the Miners' Union shall obtain an agreement from Mr. Scallon and Mr. H. H. Rogers that the Amalgamated mines will be kept in continuous operation for the next year and that the present rate of wages prevailing in the Butte mines and smelters shall be maintained for a period of at least three years.

"As a separate and distinct offer and looking to a settlement of the entire mining controversy, I hereby further agree to select two men, the Amalgamated Company to select two men, and these four to select a fifth, which committee shall have the right to settle all disputes and the ownership of all controverted ore bodies, and declare the right of the respective parties which decision shall be final and binding. I hereby bind myself to the prompt and immediate execution and carrying into effect of either or both of the above offers, if the same is accepted."

Denver. Oct. 24.

(*From Our Special Correspondent.*)

The strike among the employes of the Ohio & Colorado Smelting & Refining Co. at Salida is over. The big 350-ton furnace is now in full operation, and the plant is running as before the trouble, with practically the old force at work.

At Cripple Creek not only has the miners' union, dominated by the Western Federation of Miners, almost fallen to pieces, but the unions of engineers, mill and smelter men, ore haulers and teamsters have lost in membership. The break has extended even to the cooks and waiters and to the bartenders' union and threatens others. This remarkable change has been brought about by the unreasonable attitude of the leaders of the unions. There are now employed in the district 1,800 miners and mechanics in non-union mines, samplers and mills where, prior to the strike more than 90 per cent. were union men. Of this number 1,589 are employed in the mines of the companies holding membership in the Mine Owners' & Operators' Association; 147 in the so-called "unfair" mills, samplers and power plants of the district, while, at a low estimate, 65 union men formerly employed as cooks, waiters, bartenders, ore haulers and teamsters have been replaced by a like number of non-union men. A considerable number of union miners have left the district seeking employment elsewhere.

Many Eastern men have been visiting Idaho Springs in connection with new mining interests in the locality. This inflow of outside capital has materially increased since the law-abiding citizens showed their opinion of the Western Federation of Miners, and proclaimed their intention of protecting property.

The few remaining members of the local miners' union are unable to obtain employment, as the mine operators will have nothing to do with them.

It looks as if the union coal miners in this State will shortly go on a strike, although it does not seem possible for them to accomplish anything. The men in the mines in the northern coal-field around Boulder may walk out, and possibly, some or all of those mines will be shut down. This will enlarge the market for coal from the southern coal field around Trinidad, Cañon City, etc., and thus tend to make the management of the southern mines less disposed to concede anything to the comparatively small number of their employes who may join the strike.

The miners there are not generally members of the union and are said to be satisfied with the wages and working conditions. What a strike could accomplish it is difficult to see.

The strike situation around Telluride remains unchanged except that there are indications that the owners of some of the large properties are preparing to resume operations.

San Francisco. Oct. 21.

(From Our Special Correspondent.)

Something which has been expected for a long time, but which only happened this week, is the arrest of George W. Rumble, of the Sunset Mining Co., "operating" the Old Glory mine at Morris ravine, near Oroville, Butte county, on complaint of the postal authorities for using the United States mails in advertising his mining schemes. It is surprising how many persons were attracted by the promises of 2% dividends monthly. Rumble has been shown up in the local newspapers, and his mining schemes were described by the State mineralogist, but he kept on advertising and continued to find investors. In his advertisements he has pictured nuggets from monthly clean-ups at his mine which were enough to exercise the cupidity of hundreds of persons unfamiliar with mining. He has, it is alleged, stated that the company has paid 108 monthly dividends. During a certain lapse in the banking laws of the State he founded the Alliance Bank, which was used as a reference. The postal inspector states that the cashier of this bank is a mythical person. It is claimed in the complaint that none of the property ever paid any dividends out of the proceeds from the said mines, but that the dividends were from money secured from stock sales. Stock was sold in Hartford, Conn., Toledo, O., New York City, Milwaukee and many other points east of the Mississippi, but none was offered in California. Some people put in as much as $10,000 to $15,000. The books of the company have not been found, but the whole scheme will doubtless be ventilated in the courts. Rumble is well advanced in years, and is said to have made upward of $100,000 by his stock operations. One man alone is said to have paid in $50,000 since last June. Rumble has been released on bail.

Another mining promoter who has made money by advertising is Letson Balliet, of the White Swan Mines Company, Ltd. His mail is now being held up on an order from the Postmaster-General. The mine is near Baker City, Ore. Postmasters are instructed to return all mail addressed to the company in question or to Balliet, stamped "fraudulent." Balliet organized the Pacific Securities & Trust Co., and is charged with having sold some $200,000 worth of stock in the White Swan mine, on which but $7,000 has been spent. Balliet was sentenced November 7, 1902, by Judge Munger, of the United States Court at Des Moines to pay a fine of $1,000 and serve one year in the county jail. The case was appealed and is still pending. The same individual is supposed to be operating the Niagara mine, in Nevada county, this State.

A temporary injunction has been obtained by Italian vegetable growers restraining the operations of the Pyne smelting works in Alameda, on the claim that the sulphurous fumes were doing damage to the gardens. The matter will be heard by the courts.

Most of the former union miners and employes of the Yellow Aster mine, at Randsburg, Kern county, have left the place, and the mine and mills now have a full crew of non-union men. This is a distinct triumph for the Southwest Mine Operators' Association.

Victoria, B. C. Oct. 20

(From Our Special Correspondent.)

A consignment of 85,000 oz. of silver, .999 fine, was made by the Canadian Smelting Works at Trail last week to San Francisco, the metal having been recovered by the electrolytic process used in the refining of matte from the silver-lead ores of the Slocan district. When the refinery was first operated the silver slimes were sold to the United States refineries. A first shipment of about 1,000 oz. of gold, .995 fine, was also recently made from Trail to the United States assay office at Seattle.

W. F. Robertson, provincial mineralogist, who recently visited officially the new Poplar Creek gold field, states that there is a very large mineralized area, and that the indications are exceptionally promising, though reports have been exaggerated. Mr. Robertson is now preparing a report on the coal and oil areas of southeast Kootenay.

The first annual meeting of the Providence Mining Co. was held in Greenwood last week. During the year 543 tons of gold-silver ore were shipped, yielding a net profit of $31,192, or nearly $57.50 per ton. The cost of mining, $42.55, would appear to be exceptionally high, but the ore-bodies are very narrow, only averaging 6 ins. wide, while the rock is very hard. The manager estimates that there are now in sight 750 tons of ore averaging $100 to the ton. The regular monthly dividend for October has been declared.

A new tunnel is being driven by the Granby Co. to connect with the 200-ft. level of the Old Ironsides mine. The case of the Centre Star Mining Co. vs. the Rossland-Kootenay Mining Co. came up for hearing before the Supreme Court last week, but was adjourned until December to give the litigants the opportunity to effect an arrangement. The plaintiffs are suing for the value of ore alleged to have been taken from the Centre Star ground by the defendants, and also for damages said to have been caused by water draining from the Rossland-Kootenay properties into the Centre Star workings.

Negotiations are in progress for leasing the 20-stamp mill and tramway of the Poorman-Granite mine at Nelson to the Star Mining & Milling Co., a new undertaking. At the Atlin mine, in Ymir camp, a 6-ft. vein of $7 to $8 ore has been cut by a crosscut 210 ft. from the mouth of the tunnel. In the Slocan, the Jackson mine, at Whitewater, has temporarily closed pending the installation of machinery to save the zinc values. At New Denver the Wakefield concentrator is turning out a fine lead concentrate—65 per cent lead and 100 to 120 oz. silver—and a zinc concentrate, 45 per cent zinc and about 70 oz. silver to the ton. There are 100 tons of zinc concentrates on the wharf ready for shipment.

The directors of the Kintla Lake Oil Co. have decided to resume drilling, the necessary money having been secured.

Twenty-two carloads of machinery have arrived at Lytton to be used in the construction of a dredge in the Thompson river.

It is estimated that the gold yields from Atlin this year will reach $400,000. The season has been fairly satisfactory.

San Luis Potosi. Oct. 20.

(From Our Special Correspondent.)

Several small American mining companies were caught in the failure of the International Bank and Trust Co.

In Jalisco there is considerable activity around Ahualulco and Etzatlan. At Ahualulco Richard Eames, Jr., of New York, is examining the ore deposits of La Fortuna Mining Co., working the Candelaria and Patrocino mine under the management of F. W. Harold, to determine the size of the mill the company is planning. At Etzatlan the Santo Domingo of the Amparo Mining Co. is said to be shipping 50 tons to Torreon, and a reduction plant is contemplated; while adjoining the Santo Domingo the Mexican Exploration and Development Co. has taken up considerable territory. Sixty miles north from Etzatlan, at Hostotepequilla, the San Felipe Mining Co. is putting in a 5-stamp mill under the superintendence of W. C. Nold. A fine free milling ore is reported as opened up in the Hart mine, Ameca. The New York Mining and Exploration Co. has bought the Belen mine, of Tapalpa, for $50,000, Mexican, and is preparing for considerable development.

In the State of San Luis Potosi the Charcas camp has taken a new lease on life, especially noticeable since the purchase last year of the Tiro General mine by a company composed principally of residents of San Luis Potosi, Aguas Calientes and Mexico, the three principal mines. The unwatering of the Tiro General mine continues satisfactorily, and shipments from the dump are at the rate of from 500 to 700 tons a week, the freight and smelter situations not permitting of larger shipments. The San Sebastian mine, formerly known as La Campana, has been sold to the Senores Barreuechea, of San Luis Potosi and Matehuala, and work will start as soon as possible. On the Trinidad, adjoining the Tiro General on the west, the leveling for the new steam hoist has been finished and heavy shipments will soon start. The Morelos mine is another of the regular shippers.

The latest strike of oil reported comes from D. P. Maybery, in the State of Tabasco. The Tehuantepec Mutual Planters' Association of Chicago, has increased its capitalization from $100,000 to $500,000, Mexican, and will drill for oil at several points on the isthmus. The fields at Ebano, Tamaulipas, have thus far given the best product. Near Tampico the New York Asphalt Company is erecting refining ovens for the treatment of its product from lands close by. Near Columbia, Tamaulipas, Amador Sanchez has started development work on his coal lands.

The iron and steel plant at Monterey, Nuevo Leon, is producing steel rails. A strike is reported in the property of the Esperanza Mining Company on Laitre mountain, near Monterey.

In the territory of Tepic, the San Blas Mining Co., of Boston, with D. J. Brown as president, is shipping in considerable machinery for its mines near Caborea.

In El Oro and Tlalpujahua, of Mexico and Michoacan, the Santiago y Anexas has decided on a 100-stamp mill; El Nacional is making tests on its ores, preparatory to designing a mill, and the Chihuahua Mining Co. is preparing to increase its capital from $75,000 to $300,000, Mexican. A Colorado company with $600,000, gold, capital, has just been organized by F. J. O'Brien to work in Chalchiltepec, 50 miles west of Toluca, Mexico; the Santa Rosalia, in the same district, is worked by a company with $240,000, Mexican, capital, organized by M. Miller, of El Oro.

Notwithstanding the continued rise in silver exchange on New York remained a fraction above 216 during the week, closing at 216, with almost no business. Dealings in mining stocks were the lightest for some months, the principal dealings being: Victoria, $150; Dos Estrellas, $2,800; Aldebaran, $130; Luz de Borda, $155; Santa Rosa, $35; Progreso, $30; Barreno, $62; La Paz, Matehuala, $710; Sta. Gertrudis, $82½; San Rafael, $1,720; Amistad y Concordia, $75, and La Blanca, $412.

London. Oct. 17.

(From Our Special Correspondent.)

A company of considerable interest and importance has been introduced to the public this week. This is the Tasmania Gold Mining Co., Ltd., which has been formed to acquire a well-known property situated 27 miles north of Launceston, Tasmania. The flotation has been arranged privately and the cash capital is guaranteed. The advertisement of the prospectus is merely a matter of routine to comply with Stock Exchange requirements. The fact that John Taylor & Sons have reported on the property and are to undertake the management is sufficient indication of the status of the company. The properties to be taken over have hitherto been worked by a local company, which acquired them in 1888, and before that year operations had been conducted by individual owners. In the early years a great deal of gold was obtained, but with depth the water difficulty made work unprofitable to the individual of small means, and the consolidation of all the properties in 1888 introduced new capital, which put them on a paying basis. Since that year over £2,000,000 in gold has been extracted, and dividends paid of about £800,000. The same difficulty has now overtaken the company that swamped the small owners 15 years ago. As the mine has been opened in depth, the volume of water coming in has steadily increased. In fact, the fissure of the vein appears to show that it is the main drainage channel for the land for miles around. It is only by a very special provision for pumping that success can be attained, and it is also necessary to reorganize the mine generally with a view to working on a large scale economically. Though the shaft is 1,000 ft. down, the ore shows no sign of exhaustion, and large reserves are blocked out or exposed. There is already a battery of 105 stamps, and it is proposed to put down 40 more, so as to bring up the capacity to about 90,000 tons a year. The amount of ore already exposed is estimated at three years' supply, and its average contents is estimated at $15. The amount of capital required for the reorganization of the company on a profitable basis is £180,000, and the total capital of the company is to be £500,000. The prospectus also gives interesting information as to the remuneration to be paid to the managers, John Taylor & Sons. They are to receive £850 per annum—out of which they provide office accommodation and clerical staff—also 2½% of the net profits distributed every year, but not to exceed £2,500 a year. In addition, two members of the firm are on the board of directors, and will draw £150 a year each for that service, besides sharing with their five fellow directors 2½% of the amount of the net profits distributed in any year after a dividend at the rate of 10% has been paid to shareholders, but the maximum to be £2,500. It is not often that a prospectus gives such complete details of the way in which the management is paid.

There is no worse enemy of international amity than the peddler of fake mining schemes that comes across from America and bamboozles the confiding British public. Many of them, fortunately, reap little reward, but some of them wax fat on ill-gotten gains. One of the worst cases recently is that of E. R. Holden & Co., who started in London in a large way in "swell" offices, claiming to be the owners of valuable oil properties, the Sand Fork and the St. Marys Petroleum. They styled themselves bankers and gave vague addresses in New York, Philadelphia and Chicago. After getting everything they could here they removed to Paris, and apparently placed large blocks of stock there as well. To insure confidence, these people paid interest coupons up to a certain point out of capital, but when the demand for shares began to

slacken there was no further need to pay coupons; so on October 1, when coupons were presented, it was found the birds had flown to New York. Has not the time arrived when the friendliness of the English and American nations should be sufficient to warrant an extradition treaty for all offences?

A new prospectus is rare nowadays. The monotony has been broken by the issue of the Abbeville Gold Mines, Ltd., which has been formed to acquire a property of that name in Barberton, Transvaal. The company, so far as its directors and promotion are concerned, is of no particular interest, but the report of Mr. John H. Lucas, which was made for the venders, deserves more than passing notitce. It is a perfectly candid and unbiased report, drawing attention to such drawbacks as the hardness of the rock, the irregularity of the veins, and the dangerous nature of the rocky surface of the ground. He does not omit the assays that gave only traces, and in all cases he gives the widths over which the assays were taken. There are many mining engineers of higher position than Mr. Lucas who do not make their reports so candid.

Johannesburg. Sept. 28.

(*From Our Special Correspondent.*)

There have been a number of government commissions to investigate different questions, during the past two years. The Water Commission, which sat some 18 months ago, took valuable evidence as to the future water supply for the city and mines. The Miners' Phthisis Commission only recently handed in its voluminous report, which attributes the high death rate among miners to silicosis, a dust disease, while bad ventilation, etc., were secondary causes. Many members of the leading scientific society of Johannesburg believe that the principal cause is not silicosis but noxious gases. The discussion has, at least, brought out the fact that the report is by no means as complete as it might have been.

Just now there are two important commissions in session, the Housing Commission and the Labor Commission. Owing to the limited accommodation for people and the general complaint of high rents, the government is investigating the whole question. It is apparent that the chief causes of the trouble are the high price of land, the wretched system of leasehold, etc. Ground is held so high and material and labor cost so much that when a cottage is finished the landlord must charge a big rent to get a fair interest on his investment. In cases twice as much as is charged for the same house in the cities of England and America. It is unfortunate that 99-year leases of land are so common, whole townships are built on land held in this way.

While the Housing Commission investigates the problem on the mines, its attention is chiefly given to the conditions of the city and suburbs. The mining companies put up houses for their employees. The cheapest work I know of, in the building line, was a group of cottages put up on a large mine. There were three rooms and a kitchen in each house and the cost price per house was £280. The rental on the mines is fixed so as to bring in 10 per cent on the money invested. This rental as a rule is one-half what is paid for the same class of dwelling in the town. The reasons why the mining companies can charge less rent and yet get a good return on their outlay are the lower cost of material at the mines and the fact that nothing is paid for the land. So every employe gets a house on the mine, if possible. The Housing Commission's chief recommendation will probably be the rapid construction of electric tram lines to the outlying suburbs, so that the business man can live seven or eight miles from his office, without inconvenience. The present tram service is so wretched that people cannot live far from the center of the town, unless they are fortunate enough to own a horse and carriage.

The Labor Commission is undoubtedly the most important commission yet appointed. It is investigating the problem very thoroughly, calling in evidence of all kinds, from all parts of South Africa. It is highly probable that they will report that there is an inadequate supply of native labor in South Africa, and recommend the importation of unskilled laborers. There is no doubt now that Chinese laborers are available in large numbers, and I believe we will have a sample on the Rand by the beginning of the new year.

On the whole, the Boer leaders are not proving such enemies of the importation scheme as people predicted. As one of their generals said, if we are to have a large number of rough laborers on the Rand, it is better to have laborers with no votes, than complicate matters with thousands of "poor whites" from Europe, who would be troublesome politically, and intermingle with the native races, producing a half caste population. Not only is the mining industry suffering from the scarcity of labor, but the farmers, especially the Boers, are having a hard time. The labor problem therefore is their problem as well as ours.

T. LANE CARTER.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

Calumet & Pittsburg.—This company, operating at Bisbee, is to test its ore deposits by a diamond drill. On the ninth level a deposit of low-grade copper 75 ft. wide was encountered, and the drill will be used to prove its extent.

Junction Development Co.—A strike of copper-glance is reported on this property, near Bisbee, at 140 ft. The claims are owned practically by the same interests that control the Calumet & Arizona, near by, and have been prospected at several points by diamond drills to 800 ft. The results have induced the company to start a four-compartment shaft.

Lucky Tiger and Bisbee Queen.—R. F. Graham has purchased the interest of R. L. Benton in these mines, the latter retiring from the firm of B. F. Graham & Co. W. A. DeCamp, who was mine superintendent at the Lucky Tiger property, will have charge. The company made a payment of $72,000 recently, leaving $48,000 to be paid on the third installment April 1, 1904.

YAVAPAI COUNTY.

Chicago.—An 18-in. streak of gold ore is reported in this mine, on Groom creek, at the 300-ft. level. A large pump and air compressor are to be installed.

Hidden Treasure Mining Co.—This company, of Prescott, E. S. Campbell, manager, is to put in a 4-mile pipe line.

Jerome Canyon Copper Co.—The new machinery is reported installed. The working shaft is down 200 ft. and will go to 300 ft., when connection will be made with the old working.

CALIFORNIA.

AMADOR COUNTY.

Fremont Mining Co.—The new 60-stamp mill of this company at Amador City has started with superintendent Arthur Goodall in charge and a large amount of ore is ready for crushing produced from the old Gover mine. For two or three years work has been done on the property, but it has not been a producer until recently.

BUTTE COUNTY.

Sunset Mining Co.—M. A. Fritz has begun suit for labor and materials against this company, which has been operating the Old Glory mine in Morris ravine, near Oroville, Geo. W. Rumble, manager. The Chico *Record* says that the mine was closed down recently and the men paid off in coin instead of in checks. The men signed what they supposed to be the pay-roll, but it appears they signed an assignment of their claims to one M. A. Fritz instead, and this assignment is the basis of the suit against the Sunset Company. Rumble has been arrested by Government authorities for using the mails for advertising a fraudulent mining scheme.

CALAVERAS COUNTY.

Horseshoe Bend Mining Co.—This company at Robinsons is building a dam to bring water power to properties recently acquired. Injunction proceedings have been started against it on the ground that the resultant rise of the river will destroy the foundation of the mill of the Melones Mining Company.

Petticoat Consolidated.—J. L. Green is endeavoring to secure options on these properties 16 miles from Mokelumne hill and will sink shafts to develop them if he succeeds.

South Bank.—At this mine at Sheep Ranch, H. Clary, manager, a new 25-stamp mill and a hoist will be erected.

KERN COUNTY.

Exposed Treasure Mining Co.—This company, near Mohave, intends adding 30 stamps to the 20-stamp mill.

Flamioflume Mining Co.—This company, operating 16 miles from Mohave, in Jawbone cañon, has 15 men at work and has finished the foundations for a mill.

Karma Mining Co.—This company at Mohave, J. R. Gerner, superintendent, has a 10-stamp mill and will add 10 more stamps.

Mammoth Coal Co.—This company, of Garlock, is preparing to prospect its claims with diamond drills.

MARIPOSA COUNTY.

Teats.—This mine, at Whitlock, has been bonded by B. E. Hanna and J. J. Nevils, who have begun development work.

NEVADA COUNTY.

Blue Tent.—At this gravel mine, Clifford Graham, superintendent, a building for a new 20-stamp mill is being put up.

Brophy Creek.—For this mine at Cherokee, R. L. Thomas, manager, a centrifugal pump is being put in to elevate the gravel to the sluices.

Cassidy.—The miners who have begun work on this mine at Grass Valley are contemplating many improvements, among the first being the installation of electric power.

Champion Mining Co.—This company at Nevada City, which recently closed down, has decided to resume operations on the Merrifield mine. A small force is at work and John Tredinnick is superintendent.

East Orleans.—In this mine at Nevada City the new shaft is progressing favorably. Two shafts are being sunk. The mine is owned by the Gold Tunnel Mining Co.

El Oro.—This mine, formerly the Yuba, at Maybert, is working again under superintendent J. L. Bryson.

Empire Mining Co.—This company, which recently bought the machinery of the Allison ranch mine, will not move the compressors or mill at present, but will use the compressors for power for the Omaha mine and build a pipe line to Grass Valley. Some of the machinery will be moved to the Omaha, which is operated by the Empire Co.

German.—This mine, near Maybert, which has been idle some years, will shortly be reopened by M. D. Colley and others.

Hudson.—This mine, at Rough & Ready, C. E. Gallup, superintendent, which has been idle some time, is again being developed.

New York-Grass Valley Mining Co.—Two new 3-stamp Merrals mills are being added to the equipment of this company at Grass Valley.

Phelps Hill Mining and Development Co.—This company, at Nevada City, has elected W. P. Ketcham president, C. A. Poage vice-president and manager, C. R. Quackenbush secretary, W. H. Martin, W. H. Dunlap, D. E. Morgan and P. F. Simonds. A gravel mine is being opened.

Quartz Quarry Gold Mining Co.—This company, at North San Juan, hopes to purchase the 40-stamp mill of the Gold Bank mine at Forbestown, having secured an option on the plant. The machinery will be run by electricity.

Zeibright.—The machinery of La Suerte mill is being hauled to this property at Bear Valley. A compressor will be put in this fall. A new 15-in. pipe has been ordered to convey water from the main ditch of the South Yuba Co.

PLUMAS COUNTY.

Plumas-Eureka.—This property at Johnsville, owned by the Sierra Buttes Mining Co., Ltd., of London, Eng., has been under lease for a few years past, and is now reported sold to eastern men. Negotiations have been going on for some time.

SACRAMENTO COUNTY.

Blue Ravine Mining Co.—This company will erect two plants on its property near Folsom, one on the lower end of the Broder ranch, a mile from its present plant.

Folsom Development Co.—This company is prospecting with drills at various places on its property above Folsom. There is talk of building several dredges.

Gray Wing Mining Co.—This property, one of the most successful of the drift mines near Folsom, has a new shaft and its new plant almost completed.

Hupp & Roberts.—This firm has been for a couple of years trying to find pay gravel on the Perrazo ranch, near Blue ravine, above Folsom, and has started a new shaft about 800 ft. from the old one. The machinery has been moved to the new location.

Prosperity Mining Co.—This drift mine above Folsom, which was closed down some time since, is to be reopened and new machinery has been installed.

Sutter Mining Co.—This Sacramento company is now sinking a shaft on the Murray place, above Folsom, where the ground has lately been prospected by a Keystone drill.

SAN BERNARDINO COUNTY.

Bagdad Mining Co.—This company at Ludlow is shipping its selected ore to the smelter on San Francisco bay and the free milling ore is being sent to the mills at Barstow. About three carloads a day are milled.

SHASTA COUNTY.

Crown Deep.—At this mine, 4 miles from Redding, in Lower Springs district, 18 men are at work. A spur track is being laid to ship the ore to the smelters at Keswick.

Keystone.—For this mine at Old Diggings a smelter is planned by the people holding the bond. The new owners are to run a tunnel to tap the ore known to exist.

Old Spanish.—This old mine at Lower Springs is being reopened; several shafts have been sunk to determine the best point for work.

Shasta May Blossom.—At this mine near De Lamar, Morton Lindley manager, a diamond drill is employed. A tunnel is being run under the old workings.

SISKIYOU COUNTY.

Black Bear.—This famous old mine at Black Bear, owned for many years by Governor John Daggett, is about to be worked again under his supervision by the new company which has taken hold of it. The mine has a good record, but of late years has not been profitable, owing to lack of funds for proper development work. The mine is equipped with mill, houses, etc., but other machinery is to be provided.

Salmon River Mining Co.—This company near Cecilville is building its flume across the river where the trestle is 100 ft. high. It will have the flume completed by the time the winter rains come.

Wide Oak Mining Co.—This is a new company organized at Etna to operate on a porphyry dike between Indian and Adams creeks. Herbert Finley is general manager and has begun work with a small force.

Yreka Mill and Mining Co.—A trial is going on at Yreka in the case of Stephens against this company, the plaintiff asserting that the company has tunneled under his claim and taken out valuable ore, for which he asks $150,000 damages.

STANISLAUS COUNTY.

Martel Mining Co.—This company, owning large magnesite claims back of Livermore, has given a mortgage on its property as a basis for the issuance of bonds.

TRINITY COUNTY.

A new mine of chrysoprase, gem material, has been opened on the John Hill ranch, southeast of Exeter, and C. E. Goodale, the superintendent, has three men at work.

Brown Bear.—At this mine, Deadwood, a little work is still done and the mill kept running.

Bullychoop Mining Co.—At this property at the head of Indian creek, J. S. Stevenson, superintendent, W. B. Gester, general manager, 20 men are at work and about 30 tons of ore are daily crushed. An air compressor and power drills are to be installed.

California Surety Gold Mining Co.—This company is operating the Atlantic, Pacific and California groups near Carrville. The new company has done considerable tunneling this year and a crosscut now being run has developed good ore. Hugh Hume is president and general manager.

Headlight.—The owners of this mine, near Carrville, will rebuild the cyanide plant burned last summer.

Yellow Rose Mining Co.—This company, at Coffee, working the Yellow Rose of Texas mine, has let a contract for 1,000 ft. more on the lower tunnel. Twelve men are employed under manager Geo. L. Carr.

TUOLUMNE COUNTY.

Longfellow Mining Co.—The strike at this mine at Big Oak Flat has led the management to decide to extend the drifts east and west on the 450 and 500-ft. levels and sink the shaft several hundred feet deeper. An air compressor and drills will be installed.

Mohican Mining Co.—At this mine, Felix Chappelet, superintendent, the underground hoist has been put in and sinking will shortly be resumed.

Yankee Hill Mining Co.—The bond on the Vine Hill mine has been extended to this company and 5 stamps will be added to the 2-stamp mill in use. A cyanide plant will also be installed.

YUBA COUNTY.

Blue Point.—The owners of this property, near Smartsville, unable to obtain consent of the Anti-Debris Association to hydraulic off top ground, will now do the work by several hydraulic elevators. They have plenty of room to impound the debris.

COLORADO.

CHAFFEE COUNTY.

Gold Wonder.—The vein recently struck on this property, on Cameron mountain, is said to be holding out. Calvin & Dore are working it.

Latchaw Mining Co.—A gasoline engine and electric plant have been purchased for this property. The tunnel is reported in 1,500 ft., and to be driven 1,500 ft. further. The mine is on Mount Princeton, near Buena Vista.

CLEAR CREEK COUNTY.

Kirtley.—This old mine is being worked by Weaver, Aldrich & Ward, who recently opened a foot of high-grade silver ore said to run from 300 to 500 oz. to the ton.

St. Paul.—The ore in this Georgetown property is reported improving, carrying more lead and gray copper in addition to the silver.

Sun & Moon.—This mine is shipping about 700 tons per month, or nearly as much as before the troubles began last February. Manager Sims, of Idaho Springs, is working about 60 men.

Stevens.—Arrangements are now completed for the erection of a 60-ton concentrator at this mine, in West Argentine. The grading is finished and everything is expected to be ready in the spring.

Terrible.—The new concentrator has been running some weeks and giving satisfaction. The mill is equipped with a crusher capable of crushing 300 tons every 24 hours and two Davis rolls, 14 by 27 in. Eight jigs are used and three Wilfley tables and two frue vanners. The company has a large dam and over a mile of pipe line to furnish power for mining and milling. About 50 men with five machine drills are breaking ore and opening new ground. There are from 8,000 to 10,000 tons of cobbing at the Dunderberg mine, which is now being hauled to the mill.

DOLORES COUNTY.

(*From Our Special Correspondent.*)

Emma.—This property, at Dunton, promises to be one of the best propositions opened in this county. A small mill erected two years ago for treating ore extracted in development runs steadily. About 50 tons are extracted per day, concentrating 15 to 1. Fifty men are employed. Richard Keller, of Dunton, is manager and leading owner.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Avon Mining Co.—This company has men building a tramway from its Avon mill, in Nevada gulch, to the Boston tunnel, the tramway being less than 1,000 ft. in length. The ores heretofore have been handled by the Gilpin Tramway Co. W. C. Dennison, Central City, is manager.

Beacon of the West.—E. A. Came, of Denver, associated with Colorado and eastern parties, has taken a lease and bond for three years for $30,000, and work is to begin at an early date. The main shaft is down nearly 200 ft. and machinery and new building is to be put up and sinking operations commenced.

Franklin Extraction Co.—Colorado and eastern men are interested, with B. G. Granville, Central City, manager. The plant is at Black Hawk, on North Clear creek, and is giving complete satisfaction. The main building is 54 by 90 ft.; its equipment consists of a 40 h. p. engine and 70 h. p. boiler, with 12 concentrating tables, sizing and settling tanks, etc.

Mutual Investment Co.—A. J. Jarmuth has deeded to this company the Gold Farm group of seven lodes and the Gold Farm placer claims in south Boulder district, the consideration being $50,000. Denver and eastern parties are interested.

Powers Mining & Milling Co.—The Powers group in Russell district is sold to this company, the reported consideration being $50,000. The main shaft will be equipped with machinery; a depth of nearly 300 ft. has been reached. The shaft shows enargite ore, carrying high copper values. Pennsylvanians are chiefly interested. Francis Murphy, Central City, is manager.

Russell Mining Co.—Missouri and Kansas men have installed a 60 h. p. boiler, a Knowles duplex station pump and Cameron sinking pump at the 335-ft. shaft at Russell, and will sink. Developments are reported satisfactory. Armond Thompson, Central City, is in charge.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The advance of silver to over 61c. has caused a number of low-grade iron leasers to resume work. The tonnage has increased to 2,600 tons daily, and a further increase is promised. The zinc production is also showing an increase.

Bartlett.—Less than 100 ft. of work remains in the tunnel. It will cut the veins at a great depth.

Best Friend.—The lessees are driving an adit to get under the old vein. Mineral has been found in several places. Work will continue all winter.

Big Chief Mining Co.—This territory has been leased to M. E. Nicholson *et al.*, who will begin shipments from the old workings. There are large bodies of manganiferous iron ore exposed, besides the lead carbonate.

Caribou Mining Co.—In addition to 150 tons of iron shipped daily from the large iron deposits, the company has increased shipments of lead ores to 50 tons daily.

Fryer Hill Mines Co.—The output is 150 tons daily, mostly sulphide ore, through the El Paso workings. The company has started up its pumps on its new Pride of the West shaft at 330 ft., and will sink to the ore, which should be encountered within 50 ft.

Grover Cleveland.—Since the opening of ore in the new workings plans are on foot for extensive development.

Louisville.—Reynolds & Hanifen have secured a large amount of territory near the Louisville, and it is understood that plans contemplate much new work.

Midas-Coronado.—The Coronado is shipping 225 tons and the Midas 100 tons daily of good iron ore. The Midas is also shipping some high-grade lead ore from the new connections at the 600-ft. levels. A lot of development work has been done and much ore is exposed. The water is handled through the Coronado pumps, 600 gal. a minute.

New Leadville Home Mining Co.—The advance in silver has enabled the company to ship 150 tons daily of iron ores. The new drift and upraise is opening a fine lead carbonate body.

Ohio & Colorado Smelting & Refining Co.—The management reports all trouble over at the Salida plant, where the men at first refused to go back to the 12-hour scale, and the plant is now running full force. The new roasters are to be started very soon.

Reindeer Mining Co.—At 300 ft. this new shaft on Rock Hill is in solid rock. It is to open up the old Dome shoot at a depth never before attempted.

Valley Leasing Co.—The company has shut down temporarily for necessary repairs. Another shipment of about 70 tons in the bins will go to the United States Zinc Co.

Western Mining Co.—The output is 100 tons daily of crude zinc ore and 100 tons daily of milling ore from the Adams properties. At the A. Y. & Minnie the output is 2,000 tons a month of smelting ore and 3,000 tons monthly of milling ore.

SAN MIGUEL COUNTY.

Double Eagle.—Work on this group, in Bridal Veil basin, will be prosecuted all winter, and it is expected that a mill will be ready for operation by the middle of November. The manager is J. H. Litchfield.

Fairview.—Work on this group in Bear creek basin is to be continued for some time. A streak of good milling ore is reported running better than one ounce gold per ton.

Japan-Flora Mines & Tunnel Company.—This company, formerly the Japan Mines Company, has acquired the Valley View group of claims, and deeds were filed recently transferring the Ajax group of five claims and a mill site to the company, the consideration being 125,000 shares of Japan-Flora stock. It is practically a consolidation of the two companies. The Ajax group is practically undeveloped. T. W. Beam, of Denver, is general manager.

Keystone.—Work has been resumed at this placer property, which suspended a short time on account of the dams at the retaining reservoirs being washed out. Arrangements were also made for ample capital to equip the mine next year with modern appliances for placer mining. The old board of directors and officers were re-elected recently with the exception of Mr. C. M. Coleman, who retired as secretary-treasurer and general manager.

(*From Our Special Correspondent.*)

The strike situation remains much the same, although there are constant rumors that the mines will start work within a few weeks. Recently a delegation headed by sheriff J. C. Rutan and W. A. Taylor, W. E. Wheeler, Jacob Fillius, Bulkeley Wells, county attorney Howe and several others waited on Gov. Peabody and asked that troops be sent to Telluride in order that the mines could start, but the Governor refused, as there has been no violence in Telluride since the strike started and no rioting of any kind.

Liberty Bell.—This company is steadily driving the lower crosscut ahead, and has two shifts busy. Machine drills are used. The company will lay a pipe line from just below the upper workings to the tunnel, a distance of a little over one-half mile. The company is employing about 30 men. Chas. A. Chase, Telluride, is superintendent.

Ophir Consolidated.—J. O. Buckley and a party of stockholders visited Telluride recently to be at the annual meeting and to look over the property. The company has expended in purchasing, developing and in erecting mill and other necessary buildings nearly $500,000. The directors are: J. O. Buckley, Thos. F. Somers, J. E. Wheeler, A. F. Fisher, George Hoadley, Henry A. Salzer, Herman Grube, Ed. S. Watson, John Barth and Aug. Hendricson, all of Wisconsin. Henry Buckley, Telluride, is manager.

Ophir District.—This section is rapidly coming to the front. The properties are principally prospects, but good showing is being made on nearly every one. Among the principal properties are the Carribeau-Montezuma, T. F. Axtell, manager; the Badger tunnel, George Dolph, manager; Old Dominion, James Belisle, manager, and several leasers on the Shoemaker, Suffolk, Globe and other properties. George Pickett, principally owner and manager of the Carbonero, is shipping the highest grade ore of any that has been sent regularly from San Miguel county in a number of years. It maintains a steady average of $70 per ton. The values are gold, silver and lead. About 15 men are employed at the property.

SUMMIT COUNTY.

Bancroft.—One shift is working steadily on this mine, and expects to cut the Queen of the West vein. It is owned by N. P. Anderson.

Golden Chord.—This property, in Clinton gulch, has a number of men opening veins in the lower tunnel.

Masontown Mining and Milling Company.—This company, of Masontown, Pa., J. V. Hoover and A. E.

Reables, incorporators, is to equip its mine near Frisco with a stamp mill.

Michigan.—This mine, on Sheep mountain, is shipping some lead ore. George T. McDonald, of Denver, has a lease upon the property and is working a number of men.

Midnight.—The tunnel in this property, near Frisco, owned by McDougal Brothers, is in 100 ft., and is showing free-milling gold ore.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Miners' Strike.—The situation remains much the same as last week. More men have gone to work and one or two new mines have started. The Ajax, which suspended work last week is working again. The troops are still here and will probably remain for some time. A number of the officers of the National Guard are in Denver attending a court-martial that is inquiring into some alleged irregularities in some of the departments. It is expected that the Mine Owners' Association will shortly issue an ultimatum giving the striking miners a certain time to renounce their allegiance to the Western Federation of Miners and to return to work. In case they do not they will not be given any work in this district now or at any future time. Almost all of the principal mines that were working before the strike are busy, though some have not as large forces as before. The so-called unfair mills are also at work. So far the strike from the Federation side has not only proved a failure but has caused a loss of prestige that may never be recovered. The other unions in the district have become much less arbitrary in their actions. From being one of the strongest union districts in the State it looks as though that in a short time that this would be a strictly non-union district.

Mary McKinney Mining Co.—This property has started up with a fair force of non-union men. This property was shut down for several weeks before the strike and had just begun work when the men were ordered out by the strike leaders.

Streator Mill.—The mill on the Streator & Cripple Creek property on the north side of Pike's Peak is nearing completion. It is being erected to treat a body of low grade ore and its operation will be watched with interest.

IDAHO.

ELMORE COUNTY.

Mono Mining Co.—This company has a tunnel in 900 ft. The Ida Elmore property has been purchased and a water power plant will be erected to furnish electricity to run the 50-stamp mill.

Sawtooth Mining Co.—This company has a 10-stamp mill, sawmill, storehouses, office, etc., erected and is said to have taken out some gold.

IDAHO COUNTY.

Colonel.—This property, at Hump, has been purchased for an eastern company, and men are erecting buildings. Fred Rice, of Spokane, manager, will work a crew all winter.

Crackerjack.—The 10-stamp mill on this property, at Hump, is said to be working satisfactorily. It is reported that a cleanup for the first 26 days produced $8,000 in gold. A 50-ton cyanide plant and a 4-drill compressor are to be installed. The work on the 170-drill electric power plant is being rushed, the dam and ditch is nearly completed, and a crew is at work setting poles and stringing wire from the plant to the mine. Everything is expected to be completed and working by December 1. W. A. Stephens is manager.

Hamilton.—A strike is reported in this group, a north extension of the Crackerjack. Four feet of ore has been encountered and 2 ft. of talc and ledge matter lies alongside it. Work will be pushed by manager M. E. S. Kinney.

NEZ PERCES COUNTY.

Eureka Mining Co.—On the Mountain Chief mine of this company three stopes are opened and two drills working in each stope. About 150 tons of ore are taken out daily. The main tunnel in the Little Giant is in 340 ft., and will be run 1,000 ft. further this winter. The company is building a 190-ft. bridge across the Imnaha.

SHOSHONE COUNTY.

Highland Chief.—The tunnel on this property, in the Pine creek district, near Wardner, is in 850 ft. The mine is said to be under bond for $150,000. A stock company has been formed to take over the mine. with the following officers: B. L. Grant, president; A. M. Phillips, secretary. They, with J. E. King, C. C. Whitney and C. W. Stanton, form the board of directors, all of St. Paul, Minn.

WASHINGTON COUNTY.

White Monument, Helena, Peacock and Blue Jacket.—These claims, near Weiser, in the Seven Devils district, owned by Helena, Mont., parties, are reported bonded to the Bingham Smelting Co., of Salt Lake City, for $525,000. The bond runs for two years. One payment has been made; another is due November 10.

ILLINOIS.

The joint convention of hoisting engineers and coal operators of Illinois, held in the rooms of the Illinois Coal Operators' Association in Chicago on October 21 and 22, failed to reach a definite agreement. All the working conditions were agreed upon, but not the wage scale. The operators offered an advance of 12½%, but the engineers who had at first demanded a flat advance of $20 per month on all classes of engineers, modified their demand to $15 per month advance to all classes of engineers. As the engineers preferred a flat advance to a percentage advance, the operators offered to compromise by offering a flat advance of $10 per month, which would be 12½% to those receiving the highest wage, $80 per month, and 16 2-3% to those receiving the lowest, $60. The engineer delegates said that they did not have the power to accept the offer, but agreed to refer the matter of the acceptance or rejection of the operators' offer to a referendum vote of the engineers. This is now being taken.

CHRISTIAN COUNTY.

(*From Our Special Correspondent.*)

Christian County Coal Co.—This company, of Taylorville, is equipping its mine with a compressed air plant and pick mining machines.

FULTON COUNTY.

(*From Our Special Correspondent.*)

Western Tube Co.—This company, of Kewanee, has purchased from the White Breast Fuel Co. the mine at Bryant on the Chicago, Burlington & Quincy Ry.

VERMILION COUNTY.

(*From Our Special Correspondent.*)

E. S. Gray, of Danville, is opening a coal mine on the Big Four Railroad, just west of the new mine recently opened by the Electric Coal Co.

INDIANA.

BLACKFORD COUNTY.

(*From Our Special Correspondent.*)

Central Oil Co.—This company recently sold its holdings, near Mt. Zion, to Chicago and English men for $150,000. The same parties purchased the leases of the Big Four Oil Company.

CLAY COUNTY.

(*From Our Special Correspondent.*)

Business in the block coal mining district is very lively. Mines could be worked every day if it were possible to secure sufficient cars to move the coal.

KNOX COUNTY.

(*From Our Special Correspondent.*)

A large tract of coal land between Bicknell, Bruceville and Wheatland is under option in the name of J. L. Oliphant, of Bloomfield. There are 11,045 acres in the tract, and a Bloomfield coal company will begin prospecting at once. Among those interested are C. E. Davis, H. L. Doney, W. B. Maddock and F. M. Dugger.

SULLIVAN COUNTY.

(*From Our Special Correspondent.*)

James Eppersen, State mine inspector, says that while many mines will have to run part time on account of the shortage of cars, there will be more coal mined this year than in the history of the State. About 40 new shafts have been opened, the greater number of them being in Sullivan and Green counties. The Bruiletts Coal Creek Co., the Cummings Coal Co. and J. S. Talley Coal Co. have each opened mines in the "smokeless district," in Vigo and Sullivan counties.

United States Steel Corporation.—This concern has decided to abandon its Sullivan county coal fields. The company had prepared to develop several thousand acres of land and establish a coking plant, but recently has been arranging to sell its property, including the material which had arrived for the construction of the plant.

VIGO COUNTY.

(*From Our Special Correspondent.*)

The miners of Jasonville mine, this county, struck because the man detailed to carry grease into the mine for greasing the chains of machinery had been discharged for declining to obey orders.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

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Corrigan, McKinney & Co.—This company's Mesabi range shipments for the year have ceased at Jordan and Commodore mines, and will cease at Stevenson soon. Jordan has shipped 190,024 tons, of which 11,234 were by rail; Commodore, 20,436 tons. Stevenson will ship better than 1,000,000 tons. Production at all these mines will be much less than was anticipated. At Jordan development goes on with a limited force, and will continue all winter preparing for milling next season. At Commodore six drills are testing the ore measures, with a view to possible change in the method of mining.

Kanawha.—This mine, of the Colonial Mining Co., near Biwabik, has been closed permanently, the small deposit of non-bessemer ore being exhausted. The machinery will be taken out. The mine was opened in 1892.

Winnifred Iron Mining Co.—This company has ceased shipments at its Laura and Winnifred mines. Both are underground and both are in section 31, T. 28, R. 20. They ship over the Great Northern Road. Laura has shipped 87,000 and Winnifred 29,000 tons.

MONTANA.

LEWIS & CLARKE COUNTY.

Big Indian.—This mine is located at the head of Big Indian gulch, 4½ miles south of Helena. The ore is mined in an open pit, and about 310 tons are taken out daily by about 17 men. The pumps are operated by independent motors and the mill is equipped with chrome-steel cams, tappets and shoes, and cast-iron dies. The mortars are of the narrow Homestake, low-discharge pattern, and are bolted to 1,300-lb. cast-iron anvil blocks. Straight outside amalgamation is used. At first 4 by 12 ft. silvered copper plates were used to each battery, but this area has been doubled. The plates are cleaned once in 24 hours. The average saving is about 87½%. The tailings cannot be worked profitably. Nine men are employed in the mill. The total cost of mining and milling is said to be 46 7-10c. per ton.

MADISON COUNTY.

Cameron & Davis are reported to have discovered a good coal seam on Bear creek.

Bonanza.—The San Domingo Mining Co., of New York, has taken, it is said, a $50,000 bond on this claim, near Rochester.

Boss Tweed & Clipper.—These mines, owned by A. C. Burrage, which were purchased from Morris & Elling two years ago for $650,000, have been leased to them.

Fortune.—This group, owned by Richard T. Cook and Alfred S. Cook, is reported sold to a St. Paul and Minneapolis syndicate. The company has 1,000,000 shares, par value $1. It is reported that Richard and Alfred Cook received $35,000, a portion cash and the balance in stock of the company. Richard Cook is to be the manager. Sufficient money has been subscribed, it is said, to erect a 50-ton concentrator. The property is on Williams gulch, about four miles west of Helena, and comprises about 300 acres. The Fortune claim is patented and developed by a 330-ft. tunnel and a 200-ft. shaft.

Oregon.—The men working this mine are putting up a mill for the milling ore, while the high-grade ore will be shipped to Butte and Helena.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Montana Ore Purchasing Co.—A portion of the eastern end of the Rarus mine has been transferred by this company to the Johnstown Mining Co.; consideration, $1,000,000. Both of these corporations are part of the United Copper Co. The part of the Rarus transferred is in conflict with the Michael Davitt claim, owned by the Butte & Boston Co.

Taylor & Brunton Ore Co.—The new sampler is in commission. The plant has a capacity of 500 tons of ore per day. The entire shipment is put through the mill. The ore is received in drop bottomed cars and is caught in a hopper placed under the railroad track. From the hopper the ore is fed to a crusher by a shaking device, or apron. From the crusher elevators carry the crushed ore to the top of a five-story building, where it is dropped through the several floors, passing through an automatic sampling device on each floor.

YELLOWSTONE COUNTY.

Cliff.—Q. R. Reisser and W. J. Casey are doing assessment work on this Park City group, which they own jointly. The property adjoins the Mountain Boy, and is said to be showing up well.

Galena King.—The tunnel is in 260 ft. on this group, being worked by Balthus & Sharp, of Park City.

Montana and Iron Mountain.—A 12-ft. vein that runs from $6 to $22 per ton in gold and silver is reported on these Park City claims. It has been developed by an open cut, two 10-ft. shafts and a 26-ft. tunnel.

Mountain Boy.—Richard Purcell and Harry Crounce have a year's lease on this Park City property, and are getting out silver-lead ore.

NEVADA.

HUMBOLDT COUNTY.

Pioneer.—The Las Perlas Company, working this mine at Orleans, expects the machinery for a new mill in a few weeks.

NYE COUNTY.

(*From Our Special Correspondent.*)

North Star.—This property is developing well. The principal vein struck in a crosscut from the 950-ft. level is 4 ft. wide, with an average value of $175 per ton. A shoot of ore with much brittle silver and horn silver is opened, which promises to yield well.

Tonopah Mining Co.—The developments in this company's property continue satisfactory, and about 135 men are continuously employed. The monthly expenses are reported covered by daily shipments of about 10 tons of ore from the west drift on the 500-ft. level of the Mizpah vein.

Tonopah & Salt Lake Mining Co.—The report presented at the annual meeting in Salt Lake City on October 3 showed that $56,041 had been expended on the property, the present indebtedness being $29,643. The management estimated that the available ore reserves, of an average value of $30 per ton, should yield a net profit of $140,000 when milling facilities are available, the cost of milling being estimated at $7.50 per ton. Windsor V. Rice, Charles E. Knox. Jacob Bamberger and Wm. P. O'Meara were elected directors.

Tonopah Railway.—Several prominent stockholders in the Tonopah Mining Co. and the Belmont Development Co. have incorporated a company to construct a railway to Tonopah from Rhodes, a point about five miles south of Sodaville, on the Carson & Candelaria Railway, a branch of the Southern Pacific. The road will be narrow gauge and about 60 miles long, with no grade steeper than 4%. Mr. P. Iglehart, lately with the Baltimore & Ohio Railway, has been appointed constructing engineer, and is now on the ground with a large staff of assistants completing the final survey. Rails and tees have been purchased and the equipment of an abandoned road in New York State has been secured. It is believed that the railway will be in operation to Stewarts Wells, 12 miles from Tonopah. by March. The Tonopah Mining Co. has got water by drilling at Stewarts Wells, and will erect a big milling plant there as soon as the railway is constructed. The Lone Mountain district will be within six miles of the railway.

NEW MEXICO.

GRANT COUNTY.

Carbonate.—Work is suspended on this claim, near Lordsburg, on account of water. The company will soon put in a pump and continue sinking.

Michigan-New Mexico Copper Co.—This company, of Lordsburg, will shortly install a 60-ton smelter and 50-ton concentrator and leaching plant.

Owl Mining Co.—This Lordsburg company is putting down three shafts on the Owl claim, at Gold Gulch, and has installed a steam pump.

OHIO.

JACKSON COUNTY.

Jackson County Coal Co.—Capt. Frank H. Miller, president of this company, has closed a deal with Toledo and New York men for the purchase of the interests of the company for something over $200,000. The property is about eight miles southeast of Jackson, and at present between 200 and 300 men are employed. Many improvements are planned. A plant for the manufacturing of Portland cement is to be erected; also one in which fire and building brick will be made.

OREGON.

JOSEPHINE COUNTY.

Dutch Johnnie.—This hydraulic placer mine, on Rogue river, below Grant's Pass, which has been in litigation for a number of years, has been cleared of all entanglements by the courts, and is now the property of W. H. Flanagan, of Grant's Pass. A crew is getting the piping and flumes in shape, and one or two giants will be set to work when the rains start.

Mountainview Copper Co.—The sale of this company's property near Grant's Pass is reported for $24,000. The claims are equipped with a 30-ton Vulcan smelter and other machinery for treating the copper ore.

Yellow Horn.—This quartz mine, near Placer, has been bonded by R. E. Brown for $10,000 from H. H. Conger. A 6-ft. ledge of $30 gold ore is reported opened.

MALHEUR COUNTY.

Black Eagle.—This mine, near Malheur, is equipped with a 20-stamp mill. The milling ore is in a porphyry dike, and is quarried from open cuts, as well as mined with shafts. The mill is to be increased to 100 stamps, according to reports.

Tarbell.—This mine, near Malheur, was sold recently to a Boston company for $40,000. The new owners are erecting a hoist and contemplate installing a 10-stamp mill.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Branch Mint Mining Co.—The new 40-stamp wet-crushing cyanide plant is nearing completion.

Clover Leaf Gold Mining Co.—Rich free gold ore is reported on the 600-ft. level. Thirty stamps of the 60-stamp mill are in operation.

Dakota Gold Mining & Milling Co.—The 30-stamp wet crushing cyanide plant is to be removed from Deadwood to the company's mine at Portland at once. The company will sink a new shaft to the quartzite, expecting to go 400 ft.

Horseshoe Mining Co.—E. B. Alsop, of Pittsburg, Pa., has been elected president to succeed E. M. Holbrook, resigned.

Lexington Hill Gold Mining Co.—E. M. T. Woodworth has been appointed general manager to succeed T. T. Cornforth. The company has made another clean-up.

Lundberg-Door-Wilson Cyanide Plant.—The first carload of machinery has arrived. The plant is on the side hill next to the Buxton mine, and will receive ore from both the Buxton and Big Bonanza. Ore from the former will be trammed into the top of the mill, and from the latter will be conveyed by aerial tramway 1,000 ft. long in one span across the gulch. Power for the plant will be obtained from the Belt Electric Light & Power Co., of Lead, five miles distant.

Ruby Gold Mining & Milling Co.—The building for the new mill is completed, and James Conzett, manager, is purchasing a Chilean mill.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Gopher.—Work is resumed in this mine, near Hill City. The Lena shaft, 110 ft. deep, and the Gopher shaft, 175 ft. deep, have been unwatered and several crosscuts will be driven at the lowest levels. The mine is equipped with buildings, hoists, air compressor and drills. A. H. Elftman is consulting engineer, and A. D. Arundel, of Hill City, is superintendent.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—Settlements amounting to $514,700 were reported by Salt Lake banks during the week ending October 23, as follows: Crude ores and concentrates, $238,300; base bullion, $213,200; gold bars, $63,000.

Reables, incorporators, is to equip its mine near Frisco with a stamp mill.

Michigan.—This mine, on Sheep mountain, is shipping some lead ore. George T. McDonald, of Denver, has a lease upon the property and is working a number of men.

Midnight.—The tunnel in this property, near Frisco, owned by McDougal Brothers, is in 100 ft., and is showing free-milling gold ore.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Miners' Strike.—The situation remains much the same as last week. More men have gone to work and one or two new mines have started. The Ajax, which suspended work last week is working again. The troops are still here and will probably remain for some time. A number of the officers of the National Guard are in Denver attending a court-martial that is inquiring into some alleged irregularities in some of the departments. It is expected that the Mine Owners' Association will shortly issue an ultimatum giving the striking miners a certain time to renounce their allegiance to the Western Federation of Miners and to return to work. In case they do not they will not be given any work in this district now or at any future time. Almost all of the principal mines that were working before the strike are busy, though some have not as large forces as before. The so-called unfair mills are also at work. So far the strike from the Federation side has not only proved a failure but has caused a loss of prestige that may never be recovered. The other unions in the district have become much less arbitrary in their actions. From being one of the strongest union districts in the State it looks as though that in a short time that this would be a strictly non-union district.

Mary McKinney Mining Co.—This property has started up with a fair force of non-union men. This property was shut down for several weeks before the strike and had just begun work when the men were ordered out by the strike leaders.

Streator Mill.—The mill on the Streator & Cripple Creek property on the north side of Pike's Peak is nearing completion. It is being erected to treat a body of low grade ore and its operation will be watched with interest.

IDAHO.

ELMORE COUNTY.

Mono Mining Co.—This company has a tunnel in 900 ft. The Ida Elmore property has been purchased and a water power plant will be erected to furnish electricity to run the 50-stamp mill.

Sawtooth Mining Co.—This company has a 10-stamp mill, sawmill, storehouses, office, etc., erected and is said to have taken out some gold.

IDAHO COUNTY.

Colonel.—This property, at Hump, has been purchased for an eastern company, and men are erecting buildings. Fred Rice, of Spokane, manager, will work a crew all winter.

Crackerjack.—The 10-stamp mill on this property, at Hump, is said to be working satisfactorily. It is reported that a cleanup for the first 26 days produced $8,000 in gold. A 50-ton cyanide plant and a 4-drill compressor are to be installed. The work on the 170-drill electric power plant is being rushed, the dam and ditch is nearly completed, and a crew is at work setting poles and stringing wire from the plant to the mine. Everything is expected to be completed and working by December 1. W. A. Stephens is manager.

Hamilton.—A strike is reported in this group, a north extension of the Crackerjack. Four feet of ore has been encountered and 2 ft. of talc and ledge matter lies alongside it. Work will be pushed by manager M. E. S. Kinney.

NEZ PERCES COUNTY.

Eureka Mining Co.—On the Mountain Chief mine of this company three stopes are opened and two drills working in each stope. About 150 tons of ore are taken out daily. The main tunnel in the Little Giant is in 340 ft., and will be run 1,000 ft. further this winter. The company is building a 190-ft. bridge across the Imnaha.

SHOSHONE COUNTY.

Highland Chief.—The tunnel on this property, in the Pine creek district, near Wardner, is in 850 ft. The mine is said to be under bond for $150,000. A stock company has been formed to take over the mine, with the following officers: B. L. Grant, president; A. M. Phillips, secretary. They, with J. E. King, C. C. Whitney and C. W. Stanton, form the board of directors, all of St. Paul, Minn.

WASHINGTON COUNTY.

White Monument, Helena, Peacock and Blue Jacket.—These claims, near Weiser, in the Seven Devils district, owned by Helena, Mont., parties, are reported bonded to the Bingham Smelting Co., of Salt Lake City, for $525,000. The bond runs for two years. One payment has been made; another is due November 10.

ILLINOIS.

The joint convention of hoisting engineers and coal operators of Illinois, held in the rooms of the Illinois Coal Operators' Association in Chicago on October 21 and 22, failed to reach a definite agreement. All the working conditions were agreed upon, but not the wage scale. The operators offered an advance of 12½%, but the engineers who had at first demanded a flat advance of $20 per month on all classes of engineers, modified their demand to $15 per month advance to all classes of engineers. As the engineers preferred a flat advance to a percentage advance, the operators offered to compromise by offering a flat advance of $10 per month, which would be 12½% to those receiving the highest wage, $80 per month, and 16 2-3% to those receiving the lowest, $60. The engineer delegates said that they did not have the power to accept the offer, but agreed to refer the matter of the acceptance or rejection of the operators' offer to a referendum vote of the engineers. This is now being taken.

CHRISTIAN COUNTY.

(*From Our Special Correspondent.*)

Christian County Coal Co.—This company, of Taylorville, is equipping its mine with a compressed air plant and pick mining machines.

FULTON COUNTY.

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Western Tube Co.—This company, of Kewanee, has purchased from the White Breast Fuel Co. the mine at Bryant on the Chicago, Burlington & Quincy Ry.

VERMILION COUNTY.

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E. S. Gray, of Danville, is opening a coal mine on the Big Four Railroad, just west of the new mine recently opened by the Electric Coal Co.

INDIANA.

BLACKFORD COUNTY.

(*From Our Special Correspondent.*)

Central Oil Co.—This company recently sold its holdings, near Mt. Zion, to Chicago and English men for $150,000. The same parties purchased the leases of the Big Four Oil Company.

CLAY COUNTY.

(*From Our Special Correspondent.*)

Business in the block coal mining district is very lively. Mines could be worked every day if it were possible to secure sufficient cars to move the coal.

KNOX COUNTY.

(*From Our Special Correspondent.*)

A large tract of coal land between Bicknell, Bruceville and Wheatland is under option in the name of J. L. Oliphant, of Bloomfield. There are 11,045 acres in the tract, and a Bloomfield coal company will begin prospecting at once. Among those interested are C. E. Davis, H. L. Doney, W. B. Maddock and F. M. Dugger.

SULLIVAN COUNTY.

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James Eppersen, State mine inspector, says that while many mines will have to run part time on account of the shortage of cars, there will be more coal mined this year than in the history of the State. About 40 new shafts have been opened, the greater number of them being in Sullivan and Green counties. The Bruiletts Coal Creek Co., the Cummings Coal Co. and J. S. Talley Coal Co. have each opened mines in the "smokeless district," in Vigo and Sullivan counties.

United States Steel Corporation.—This concern has decided to abandon its Sullivan county coal fields. The company had prepared to develop several thousand acres of land and establish a coking plant, but recently has been arranging to sell its property, including the material which had arrived for the construction of the plant.

VIGO COUNTY.

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The miners of Jasonville mine, this county, struck because the man detailed to carry grease into the mine for greasing the chains of machinery had been discharged for declining to obey orders.

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(From Our Special Correspondent.)

Arcturus.—Experiments with the washing plant of the Standard Mining Co. at this mine have ceased and the mine is idle. The experiment is understood to have been successful. The property was examined by several mining engineers of the Oliver Iron Mining Co. and then shut down. The Standard Mining Co. is a W. P. Snyder interest, and all the Snyder and Clairton operations on the range are curtailed.

Corrigan, McKinney & Co.—This company's Mesabi range shipments for the year have ceased at Jordan and Commodore mines, and will cease at Stevenson soon. Jordan has shipped 190,024 tons, of which 11,234 were by rail; Commodore, 20,436 tons. Stevenson will ship better than 1,000,000 tons. Production at all these mines will be much less than was anticipated. At Jordan development goes on with a limited force, and will continue all winter preparing for milling next season. At Commodore six drills are testing the ore measures, with a view to possible change in the method of mining.

Kanawha.—This mine, of the Colonial Mining Co., near Biwabik, has been closed permanently, the small deposit of non-bessemer ore being exhausted. The machinery will be taken out. The mine was opened in 1892.

Winnifred Iron Mining Co.—This company has ceased shipments at its Laura and Winnifred mines. Both are underground and both are in section 31, T. 28, R. 20. They ship over the Great Northern Road. Laura has shipped 87,000 and Winnifred 29,000 tons.

MONTANA.

LEWIS & CLARKE COUNTY.

Big Indian.—This mine is located at the head of Big Indian gulch, 4½ miles south of Helena. The ore is mined in an open pit, and about 310 tons are taken out daily by about 17 men. The pumps are operated by independent motors and the mill is equipped with chrome-steel cams, tappets and shoes, and cast-iron dies. The mortars are of the narrow Homestake, low-discharge pattern, and are bolted to 1,300-lb. cast-iron anvil blocks. Straight outside amalgamation is used. At first 4 by 12 ft. silvered copper plates were used to each battery, but this area has been doubled. The plates are cleaned once in 24 hours. The average saving is about 87½%. The tailings cannot be worked profitably. Nine men are employed in the mill. The total cost of mining and milling is said to be 46 7-10c. per ton.

MADISON COUNTY.

Cameron & Davis are reported to have discovered a good coal seam on Bear creek.

Bonanza.—The San Domingo Mining Co., of New York, has taken, it is said, a $50,000 bond on this claim, near Rochester.

Boss Tweed & Clipper.—These mines, owned by A. C. Burrage, which were purchased from Morris & Elling two years ago for $650,000, have been leased to them.

Fortune.—This group, owned by Richard T. Cook and Alfred S. Cook, is reported sold to a St. Paul and Minneapolis syndicate. The company has 1,000,000 shares, par value $1. It is reported that Richard and Alfred Cook received $35,000, a portion cash and the balance in stock of the company. Richard Cook is to be the manager. Sufficient money has been subscribed, it is said, to erect a 50-ton concentrator. The property is on Williams gulch, about four miles west of Helena, and comprises about 300 acres. The Fortune claim is patented and developed by a 330-ft. tunnel and a 200-ft. shaft.

Oregon.—The men working this mine are putting up a mill for the milling ore, while the high-grade ore will be shipped to Butte and Helena.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

Montana Ore Purchasing Co.—A portion of the eastern end of the Rarus mine has been transferred by this company to the Johnstown Mining Co.; consideration, $1,000,000. Both of these corporations are part of the United Copper Co. The part of the Rarus transferred is in conflict with the Michael Davitt claim, owned by the Butte & Boston Co.

Taylor & Brunton Ore Co.—The new sampler is in commission. The plant has a capacity of 500 tons of ore per day. The entire shipment is put through the mill. The ore is received in drop bottomed cars and is caught in a hopper placed under the railroad track. From the hopper the ore is fed to a crusher by a shaking device, or apron. From the crusher elevators carry the crushed ore to the top of a five-story building, where it is dropped through the several floors, passing through an automatic sampling device on each floor.

YELLOWSTONE COUNTY.

Cliff.—Q. R. Reisser and W. J. Casey are doing assessment work on this Park City group, which they own jointly. The property adjoins the Mountain Boy, and is said to be showing up well.

Galena King.—The tunnel is in 260 ft. on this group, being worked by Balthus & Sharp, of Park City.

Montana and Iron Mountain.—A 12-ft. vein that runs from $6 to $22 per ton in gold and silver is reported on these Park City claims. It has been developed by an open cut, two 10-ft. shafts and a 26-ft. tunnel.

Mountain Boy.—Richard Purcell and Harry Crounce have a year's lease on this Park City property, and are getting out silver-lead ore.

NEVADA.

HUMBOLDT COUNTY.

Pioneer.—The Las Perlas Company, working this mine at Orleans, expects the machinery for a new mill in a few weeks.

NYE COUNTY.

(From Our Special Correspondent.)

North Star.—This property is developing well. The principal vein struck in a crosscut from the 950-ft. level is 4 ft. wide, with an average value of $175 per ton. A shoot of ore with much brittle silver and horn silver is opened, which promises to yield well.

Tonopah Mining Co.—The developments in this company's property continue satisfactory, and about 135 men are continuously employed. The monthly expenses are reported covered by daily shipments of about 10 tons of ore from the west drift on the 500-ft. level of the Mizpah vein.

Tonopah & Salt Lake Mining Co.—The report presented at the annual meeting in Salt Lake City on October 3 showed that $56,041 had been expended on the property, the present indebtedness being $29,643. The management estimated that the available ore reserves, of an average value of $30 per ton, should yield a net profit of $140,000 when milling facilities are available, the cost of milling being estimated at $7.50 per ton. Windsor V. Rice, Charles E. Knox, Jacob Bamberger and Wm. P. O'Meara were elected directors.

Tonopah Railway.—Several prominent stockholders in the Tonopah Mining Co. and the Belmont Development Co. have incorporated a company to construct a railway to Tonopah from Rhodes, a point about five miles south of Sodaville, on the Carson & Candelaria Railway, a branch of the Southern Pacific. The road will be narrow gauge and about 60 miles long, with no grade steeper than 4%. Mr. P. Iglehart, lately with the Baltimore & Ohio Railway, has been appointed constructing engineer, and is now on the ground with a large staff of assistants completing the final survey. Rails and tees have been purchased and the equipment of an abandoned road in New York State has been secured. It is believed that the railway will be in operation to Stewarts Wells, 12 miles from Tonopah, by March. The Tonopah Mining Co. has got water by drilling at Stewarts Wells, and will erect a big milling plant there as soon as the railway is constructed. The Lone Mountain district will be within six miles of the railway.

NEW MEXICO.

GRANT COUNTY.

Carbonate.—Work is suspended on this claim, near Lordsburg, on account of water. The company will soon put in a pump and continue sinking.

Michigan-New Mexico Copper Co.—This company, of Lordsburg, will shortly install a 60-ton smelter and 50-ton concentrator and leaching plant.

Owl Mining Co.—This Lordsburg company is putting down three shafts on the Owl claim, at Gold Gulch, and has installed a steam pump.

OHIO.

JACKSON COUNTY.

Jackson County Coal Co.—Capt. Frank H. Miller, president of this company, has closed a deal with Toledo and New York men for the purchase of the interests of the company for something over $200,000. The property is about eight miles southeast of Jackson, and at present between 200 and 300 men are employed. Many improvements are planned. A plant for the manufacturing of Portland cement is to be erected; also one in which fire and building brick will be made.

OREGON.

JOSEPHINE COUNTY.

Dutch Johnnie.—This hydraulic placer mine, on Rogue river, below Grant's Pass, which has been in litigation for a number of years, has been cleared of all entanglements by the courts, and is now the property of W. H. Flanagan, of Grant's Pass. A crew is getting the piping and flumes in shape, and one or two giants will be set to work when the rains start.

Mountainview Copper Co.—The sale of this company's property near Grant's Pass is reported for $24,000. The claims are equipped with a 30-ton Vulcan smelter and other machinery for treating the copper ore.

Yellow Horn.—This quartz mine, near Placer, has been bonded by R. E. Brown for $10,000 from H. H. Conger. A 6-ft. ledge of $30 gold ore is reported opened.

MALHEUR COUNTY.

Black Eagle.—This mine, near Malheur, is equipped with a 20-stamp mill. The milling ore is in a porphyry dike, and is quarried from open cuts, as well as mined with shafts. The mill is to be increased to 100 stamps, according to reports.

Tarbell.—This mine, near Malheur, was sold recently to a Boston company for $40,000. The new owners are erecting a hoist and contemplate installing a 10-stamp mill.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Branch Mint Mining Co.—The new 40-stamp wet-crushing cyanide plant is nearing completion.

Clover Leaf Gold Mining Co.—Rich free gold ore is reported on the 600-ft. level. Thirty stamps of the 60-stamp mill are in operation.

Dakota Gold Mining & Milling Co.—The 30-stamp wet crushing cyanide plant is to be removed from Deadwood to the company's mine at Portland at once. The company will sink a new shaft to the quartzite, expecting to go 400 ft.

Horseshoe Mining Co.—E. B. Alsop, of Pittsburg, Pa., has been elected president to succeed E. M. Holbrook, resigned.

Lexington Hill Gold Mining Co.—E. M. T. Woodworth has been appointed general manager to succeed T. T. Cornforth. The company has made another clean-up.

Lundberg-Door-Wilson Cyanide Plant.—The first carload of machinery has arrived. The plant is on the side hill next to the Buxton mine, and will receive ore from both the Buxton and Big Bonanza. Ore from the former will be trammed into the top of the mill, and from the latter will be conveyed by aerial tramway 1,000 ft. long in one span across the gulch. Power for the plant will be obtained from the Belt Electric Light & Power Co., of Lead, five miles distant.

Ruby Gold Mining & Milling Co.—The building for the new mill is completed, and James Conzett, manager, is purchasing a Chilean mill.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Gopher.—Work is resumed in this mine, near Hill City. The Lena shaft, 110 ft. deep, and the Gopher shaft, 175 ft. deep, have been unwatered and several crosscuts will be driven at the lowest levels. The mine is equipped with buildings, hoists, air compressor and drills. A. H. Elftman is consulting engineer, and A. D. Arundel, of Hill City, is superintendent.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—Settlements amounting to $514,700 were reported by Salt Lake banks during the week ending October 23, as follows: Crude ores and concentrates, $238,300; base bullion, $213,200; gold bars, $63,000.

JUAB COUNTY.

(*From Our Special Correspondent.*)

The fire that caused the closing of the Centennial-Eureka, Bullion-Beck, Eureka-Hill and Gemini has not been located after burning for nearly three weeks. The management of the former succeeded in bulkheading the only opening connecting with the other mines, thus shutting out the smoke and gases, so this mine is in operation. The others are still closed.

Tintic Shipments.—Shipments for the week ending October 23 aggregated 150 car loads, as follows: Centennial-Eureka, 46; Grand Central, 19; Mammoth, 5; Carisa, 2; Lower Mammoth, 1; Black Jack, 7; Swansea, 8; South Swansea, 10; Star Consolidated, 5; Eureka-Hill, 4; Gemini, 1; Eagle and Blue Bell, 3; Tetro, 2; Yankee Consolidated, 5; May Day, 1; Dragon Iron, 31.

Ajax.—At the annual meeting the old board of directors was re-elected, with Thomas Weir, of Salt Lake, as general manager.

Lower Mammoth.—Suit will be filed against this company by the Black Jack Mining Company in a few days for $100,000 damages for alleged unlawful extraction of ores and settlement of a question of apex.

May Day.—Sufficient water has been secured for the jigging plant to resume.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

American Smelting & Refining Co.—According to information received here the Salt Lake plants are to be enlarged at a cost of $750,000. The present output of the plants is about 1,500,000 lb. weekly of copper matte, containing gold and silver.

Bingham Consolidated.—The copper bullion shipments aggregated four car loads, 41,000 lb., during the week ending October 23.

United States.—Copper bullion shipments for the week ending October 23 aggregated three cars, 180,000 lb.

Utah Consolidated.—Contracts are being let for the addition to the smelter which will bring the capacity up to 800 tons per day. The American Bridge Co. has the contract to build a 150-ft. steel stack and dust chamber linings for the converters. The copper bullion shipments for the week ending October 23 were five cars, 301,571 lb.

Yampa Smelter.—This plant will go into commission some time in December. The power plant will be ready about November 10.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—For the week ending Oct. 22 shipments were 5,064,220 lb.; Daly-West 3,595,000, and Silver King 1,469,220 lb.

Daly-Judge.—An important strike of high grade ore carrying values in silver lead and copper is reported on the 1,400-ft. level at western end. The find is regarded as the most important in the history of the property. The ore has assayed as high as 400 oz. silver and 39 per cent copper.

Daly-West.—Preparations are being made to increase capacity of the mill about 100 tons per day.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Black Diamond.—This Stockton mine has passed to an Indiana syndicate headed by W. C. Alexander, of Lafayette.

Consolidated Mercur.—Since the adoption of the Moore slimes process at the mill the tailings have been running about 42c. per ton as against $1.22, the average of last year. The extraction, it is said, amounts to a few cents over $4 to the ton.

Honerine.—E. J. Raddatz, superintendent of this mine at Stockton has placed an order with the Mine and Smelter Supply Company for 13 Wilfley tables and one slimer, which will be installed at the new Honerine mill.

Honerine Tunnel.—At a distance of about 5,000 ft. the tunnel tapped the main water channels of the Stockton district. Water is now running out at the rate of about 1,500 gal. per minute. It is expected that all the principal mines of the camp will soon be unwatered. The Honerine, Cygnet, Cyclone, Black Diamond and Galena King are among the properties to be benefited.

WASHINGTON COUNTY.

(*From Our Special Correspondent.*)

Utah & Eastern.—Another copper furnace is to be added soon. Manager Doolittle, of St. George, has placed an order for it.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(*From Our Special Correspondent.*)

Republic Ore Shipments.—The following ore was shipped from the mines of Republic camp to the smelter for the week ending October 20: To Tacoma, from the Quilp, 20 cars; to the Hall Mines smelter, Nelson, B. C., from the Mountain Lion, 20 cars; from the Zala M., 3 cars, and from the Nob Hill, 2 cars.

Morning Glory.—Two carloads of ore await shipment to the smelter from Republic.

Mountain Lion.—The working force at Republic has been increased to 40 men. A new body of ore, recently struck on the 200-ft. level, is said to be the best ever found in the mine.

North San Poil.—A carload of ore is ready to ship.

Quilp.—The winze from the No. 5 level of this Republic mine is down 100 ft. and a drift runs south on a rich pay shoot 28 ft. Some of the ore carries streaks of sulphide of silver and native gold and silver. The strike is 640 ft. below the apex of the vein.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—The shipments for the week ending October 17 were: Granby mines to Granby smelter, 9,086; Snowshoe to Sunset smelter, 1,500 tons; Mother Lode to Greenwood, 2,272 tons; Sunset to Sunset smelter, 210 tons; Morrison to Greenwood smelter, 180 tons; Emma to Granby, Greenwood and Nelson smelters, 693 tons; Oro Denoro to Sunset smelters, 726 tons; Winnipeg to Sunset smelter, 120 tons; Athelstan to Sunset smelter, 120 tons; total for the week, 14,907 tons; total for the year to date, 497,795 tons. The tonnage has fallen off, due largely to repairs to ore crushers and blast furnaces.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—The shipments for the week ending October 17 were: Le Roi, 5,160 tons; Centre Star, 1,501 tons; War Eagle, 1,050 tons; Le Roi No. 2, 480 tons; Jumbo, 125 tons; Spitzee, 60 tons; I. X. L. (milled), 200 tons. Total for week, 8,576 tons; year to date, 313,354 tons.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Idaho.—Preparations are being made to install a second tramway at this mine, near Sandon.

Payne.—The six Wilfley tables ordered are in position replacing vanners.

YUKON

Transportation companies and shippers are making a great effort to land at Dawson thousands of tons of freight which may be subjected to indefinite delay by the freezing of the Yukon river. Water is lowering rapidly, and a freeze-up is looked for by October 25.

The White Pass railway has notified shippers that it cannot transport all of the freight now on hand at White Horse, and offers to release any portion that they can get transported to Dawson on barges or independent steamboats. Shippers have chartered the lower Yukon steamboats, which are making two round trips to White Horse, and are offering four and five times the regular freight rates to get their shipments through.

Although much freight is in transit and probably will not reach its destination, the mining camps will have ample food supplies to meet all demands during the winter. This is particularly true of the American side of the boundary line.

EUROPE.

SPAIN.

Rio Tinto Company, Ltd.—The following circular to stockholders is dated London, October 8: "Your directors have the pleasure of presenting, as usual, a brief interim report upon the company's operations during the current year. The deliveries of pyrites in the United Kingdom, the Continent of Europe and the United States of America bid fair to be considerably in excess of those of last year. The consumption of non-cupreous sulphur ore is on the increase, the larger quantities sold under the new contracts being now in course of delivery. The quantity of refined copper produced at Cwmavon may be rather greater than last year; there is the usual demand for it, and the excellent quality for which it has long been noted is maintained. There have been great fluctuations in the price of g. m. b. copper during the present year, but the average for the nine months ended September 30 last may be considered satisfactory, being £6 4s. 3d. per ton better than the average of the year 1902.

"Your directors have now the pleasure to declare, out of the estimated profits of the year, a dividend for the six months ended June 30 last of 2s. 6d. per share, less income tax, on the 5 per cent preference shares, and an interim dividend of 32s. 6d. per share, free of income tax, on the ordinary shares, both payable on November 2 next."

MINING STOCKS.

(Full quotations are given on pages 682 and 683.)

New York, Oct. 28.

The predominating feature has been Amalgamated Copper, which, besides showing the largest sales of any stock on 'change, has also furnished news that had an important bearing on market prices. The story is told in our news columns; the important point was that Amalgamated had stopped work at its various properties in Montana. This excited the stock market, with the result that on October 23 over 126,000 Amalgamated shares changed hands at about $34.50, a price very close to the lowest on record. Subsequently on October 27, Amalgamated sales were cut down to 52,485 shares, while the price advanced to $39.25, but was hammered again by professionals, closing the day at $37.50.

Anaconda, though its price moved in sympathy with Amalgamated was less active, and, in fact, no sales were reported for several days. The extreme quotations for Anaconda were $16.25 and $14.50, the latter being the lowest yet paid.

The curb coppers were in better form, although they felt the variations on 'change. Greene Consolidated, of Mexico, showed some activity on the rise from $14⅞ to $18½, but with the appearance of selling orders the price weakened. Tennessee, on inside support, advanced to $32¼, but daily dealings were limited to a few hundred shares. United (Heinze's) of Montana did not fluctuate alarmingly, in fact, the common stock showed strength, rising to $16¾. The third semi-annual dividend of 3% on the preferred shares has just been declared. White Knob, of Idaho, was in better condition, owing to the full resumption of work on its property and its first shipment of copper on October 20; the stock advanced from $9.75 to $11, closing strong. British Columbia reappeared at $2⅝, but buying was limited.

American Smelting & Refining common shares continued firm, in anticipation of a quarterly dividend in December, at the rate of 4 or 5% per annum. Sales of this security were reported at $42¼@$44⅛. The preferred stock was also stronger, advancing to $88, but its transactions were much smaller than the common.

Standard Consolidated, of California, rose to $3 on sales, Quicksilver preferred to $6.25, and Daly, of Utah, changed hands at $1.90.

Comstock share have weakened, Consolidated California & Virginia selling down to 11c. to $1.14, Ophir to $1.40, and Hale & Norcross to 55c. Silver Hill, the Nevada dividend stock, made a trade at 65c.

Cripple Creek, Colo., stocks are in little demand, awaiting the stimulus of an improvement in the western market. Elkton Consolidated sold at 42@47c., Isabella at 12c., and Portland at $1.15.

Columbus & Hocking Coal & Iron shares were in request, and sales are reported at $10@$10½, as a result of the announcement that a dividend of 1% has been recommended for the year, to be declared in quarterly instalments. Up to the present, no regular dividends have been paid by the company, although since November, 1902, three declarations of 0½% (50c. per share) have been made.

United States Steel shares made fractional advances. The common, which is now held by some 34,958 shareholders, according to a recent report, sold up to $14½ on Tuesday, while the preferred, which has 40,128 holders, moved up to $60½. It is interesting to remark that both the common and preferred stockholders show a substantial increase in number since the payment of the last quarterly dividends.

Boston. Oct. 27.

(*From Our Special Correspondent.*)

As was to be expected, the market for copper shares has broadened to an extent that has not been witnessed for many months, and stocks were eagerly taken last Friday and Saturday. Prices jumped for a while, until considerable offerings came out, which seemed to chill the bull enthusiasm and quotations had a fair setback. The present situation of affairs is not a normal one, and the sudden advance in the price of the metal, as a result of the closing down of the Amalgamated mines in Butte, may stimulate intending buyers of copper. The advance in the price by the Calumet & Hecla caused the stock to jump up $40, to $470, with a $5 setback. Thus far no large sales are reported at this price.

Copper Range Consolidated acts very heavy, and while there is a pretence at buoyancy, stock is being marketed continually. It is thought that the interests which turned their Trimountain into Copper Range are the most active sellers. The stock settled $3 to $42 last week, but the upward movement carried it to $51.50, with subsequent reaction to $47. Tamarack was carried up from $85 to $109, but has reacted to $94, and Osceola rose $10, to $63, falling back to $58.50. Parrot has advanced $3, to $19.50, and holds it. Old Dominion stock rose to $14, and reacted to $11.75 on some realizing. Utah Consolidated has the best action of any stock on the list. It

rose $4, to $29.50, closing at $28.50. The buying to-day is said to be for New York interests. Mohawk went up $4.62½ to $40.62½, reacting to $39.37½. Bingham sold up $3.37½ to $24.37½, with subsequent reaction to $23, and Centennial rose $3 to $18.75, losing to $17.50. United States rose $1.87¼ to $19, reacting to $17.75.

Sales of St. Mary's Mineral Land are reported at $50, privately. Santa Fe mining has spurted to $2.50 on prospects that mining may be resumed. Winona touched $9, being up from $6.75.

Although crude oil continues to advance, it is not reflected in the shares of the United States Coal & Oil Co., which sell at from $9@$9.50. There is an urgent demand for Boston Consolidated, on the curb, around $6. An extra dividend of 75 cents or $1 is expected to be declared by the New Idria Quicksilver Co. from current net earnings. Thus far this year 90c. per share has been paid. The stock is quoted $8@$10.

It is felt at this center that the Amalgamated Company will profit from its close-down and the resultant enhancement in the price of copper. It is also felt that when mining is again resumed, it will result in a settlement of the whole copper warfare with Heinze in whatever manner it is accomplished. The Boston & Montana earned over $5,500,000 net last year, and of this over $1,000,000 was spent in legal expenses.

Colorado Springs. Oct. 23.

(From Our Special Correspondent.)

The current week has been one of activity on the Mining Exchange, but prices have declined, especially for the leaders, and the market at the close of the week is in a weak condition. Selling orders are, no doubt, responsible for the sag. The miners' strike is regarded as practically settled, although a few of the union miners are still out. The large properties are all working full handed, the majority of the men employed being non-union. Owing to the activity of Cripple Creek mining securities, brokers generally are inclined to view the market situation from a bullish standpoint.

Acacia weakened from 6⅝c. last week to 6c. to-day. Doctor-Jack Pot followed suit, the bid price declining from 8⅜c. to 8c. Elkton sold a week ago at 47c., and to-day at 45c. El Paso was perhaps the heaviest loser on the board, selling from 59½ down to 53c., closing at the latter figure. Gold Dollar Consolidated declined from 4 to 3⅝c. Isabella kept company with the majority, selling from 11c. down to 10⅜c. Moon Anchor also sold down, from 12 to 11½c. Portland was weak, selling to-day at $1.12. The prospects were active and stationary, with the exception of Old Gold. This stock enjoyed a marked advance, selling from 7¾ up to 9½c., on reports of high grade ore in the property.

Salt Lake City. Oct. 24.

(From Our Special Correspondent.)

During the week 161,011 shares were sold on the Salt Lake Mining Exchange for the sum of $100,535. The market was weak, and little interest shown. Brokers had few outside orders to execute.

Daly-Judge, however, sold up to $11.50 per share, or at an advance of $2.50 per share. Daly West picked up some at the beginning, but afterwards relaxed. The regular dividend of 1c. a share was paid this week by the Century Company, and the stock recorded some advances. Considerable May Day was transferred early in the week, the buying being occasioned by persons seeking to get control. The directors of the Sacramento posted the usual monthly dividend of $5,000, payable November 1; while the sales have been light, steady prices were maintained. The resumption of work at the Ingot mine at Mercur has created new interest in that stock, with a few transfers noted. The principal transfers were made among the Tintic stocks; aside from May Day, Tetro and Star Consolidated were the principal participants, both showing shrinkage. New York Bonanza stiffened some on account of a favorable showing of ore encountered on the 400-ft. level. Naildriver sold down to $1, with scarcely any demand. Local brokers do not expect a material change in stocks until towards the close of the year.

San Francisco. Oct. 24.

(From Our Special Correspondent.)

Trading in Comstocks was more active this week, but at a lower range of prices. The Gold Hill stocks were most in demand.

Some quotations noted are: Ophir, $1.50@$1.55; Best & Belcher, $1.50; Consolidated California & Virginia, $1.30; Mexican, $1.05@$1.10; Hale & Norcross, 60@65c.; Sierra Nevada, 50c.; Potosi, 22c.; Gould & Curry, 18@20c.

On the San Francisco & Tonopah Exchange, business was fair, but prices rather lower. There was a considerable demand for the lower priced stocks. Tonopah Belmont brought 95c.@$1; Montana Tonopah, 95c.; Tonopah North Star, 33c.; Esperanza, 1c. per share.

In oil stocks business was dull and prices lower. Sterling sold at $2.90; Home, 85@90c.; Oil City, 28c.; Occidental, 18c. Home and Oil City were most in demand.

COAL TRADE REVIEW.

NEW YORK, Oct. 28.

ANTHRACITE.

Cold weather in all consuming territories has stimulated the buying of anthracite, and the outlook is somewhat better; but still colder weather will be needed, to create a market active enough to take such a tonnage as the mines were producing no longer ago than August. Restrictions upon output continue, and the Reading Company, on account of Mitchell day and election day, has shut down its collieries for a week. The output for October will undoubtedly show a big decrease from September figures, partly to voluntary restrictions by closing collieries, and partly to the enforced restriction on shipments by the recent floods and wash-outs. Of the roads that suffered most, the Delaware, Lackawanna & Western is now in good shape, while the Erie has repaired its right of way, but is not running trains as smoothly as before the floods came.

Trade in the Northwest has been rather quiet, but is expected to show improvement now, as the weather is colder. Receipts of coal at Duluth, and Superior docks have fallen off a little. All docks have good supplies, and receipts for the rest of the season are not expected to be heavy. In Chicago territory buying has improved a little. Lake receipts of anthracite for the season to October 10 were 988,000 tons, and the docks are now reported loaded with coal to the limits of their storage capacity. Rail receipts from April 1 to October 10 are given as 491,000 tons. The indications are that total receipts by lake and rail will surpass all previous figures. Dealers in the city and at country points are well supplied. Along the lower lakes and in Canadian territory, there is a little better demand. Along the Atlantic seaboard the market is purely a weather one. Demand just now is better; what it will be next week remains to be seen. Dealers generally, even at the shoal water ports and at little interior points have about all the coal they want at present. The steam sizes are moving somewhat more freely, but the demand for them is affected by the unsettled condition of the bituminous market.

BITUMINOUS.

The Atlantic seaboard bituminous trade is still in a rather demoralized state. Producers of the ordinary grades of Clearfield, who have been selling coal for less than schedule prices for months, have been hit by the break in prices of special grades, and are now talking things over and making suggestions, such as naming minimum prices, and of restricting production by running only on certain days each week. These suggestions, such as they are, have not been accepted by the trade at large. There has been a slight improvement in buying during the week, but not enough to be marked. Whether this increase is due to the weather or to the low prices at which some coal is offered, it is hard to tell.

The market in the far East is quiet. It is remarkable how little coal is going there, considering the usual condition at this season of the year. Along Long Island Sound consumers are taking considerable coal, demand being better than in any other territory. New York Harbor trade is quiet enough to keep prices down to $2@$2.50 for ordinary grades of Clearfield, while coal that is thrown on the market is selling as low as $2.25 f. o. b. New York Harbor shipping port. Transportation continues good, coal running through from the mines to tidewater inside a week. Car supply is up to all demands. In the coastwise vessel market vessels are in short supply. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 65c.; Boston and Portland, 75c.; Salem and Portsmouth, 80c.; Bath, 80c.; Newburyport, 90@95c.; Saco, $1.10; Bangor, $1; Gardiner, $1 and towages. Rates from the further lower ports are about the same as from Philadelphia.

Birmingham. Oct. 26.

(From Our Special Correspondent.)

The coal situation in Alabama is looking up. Large consumers are urging quick delivery again. There is a movement to fill stock-houses and bins preparatory to the usual winter rush.

The Pittsburg Coal & Coke Co.'s mines in Alabama, situated in Walker county, in and around Corona, will be called upon to furnish a large portion of the demands of the Louisiana and Mississippi trade, which is handled on the Mississippi. It is announced that the Pennsylvania mines have not the coal to spare, and the river conditions are not favorable, so that the Alabama mines will be called upon to supply considerable until then. Shipments down the Mississippi, by way of Greenville, Miss., are already heavy. The management of the mines in and around Corona have made contracts with other mining concerns for 50,000 tons of coal to help out in the temporary rush. The Southern Railway, which will handle the coal from the mines to Greenville, is pushing shipments through.

L. B. Musgrove, a coal operator in this section, says that the coal market is improving, and there is demand for almost all the coal that can be gotten out. The Walker county mines are working full blast. Good reports come from Bibb, Shelby and St. Clair counties. The mines in Jefferson county are doing well, the greater number of them being in steady operation, and the balance working more than three-fourths of the time. There is very little trouble in labor circles in the State.

Chicago. Oct. 26.

(From Our Special Correspondent.)

The wholesale and retail trades in anthracite continue to improve, both having been stimulated by the sharp weather of the last week. Consumers are buying freely, in city and country, the hesitation manifested a few weeks ago about the price having vanished in the face of announcements that the $6.50 maximum for the year will stand. Retailers are getting $7.75 in the city, on ordinary sales. There is considerable anthracite from independent dealers, on which the car price is slightly cut, but this is growing less, and will be of slight importance with the close of navigation. As the season advances it becomes apparent that transportation troubles are likely to bother the anthracite dealer less, so far as local business is concerned, than ever before. Dock stocks were never so large, and yards also are carrying large surpluses. Add to these features the fact that householders have been prudent about early domestic supplies, and it becomes evident that it will take an extraordinary congestion of traffic to cause trouble to the Chicago consumer or retailer. From western cities come similar reports, except that the general stocks in Chicago and other Lake Michigan ports appear to be larger than those in inland cities, in proportion to population and probable demand.

Bituminous trade in general is very good, for the season. Car and locomotive shortages are causing trouble, as was expected, and as much pressure as possible is being brought to bear on the railroads to increase their rolling stock. The trouble, however, seems bound to grow worse as winter comes on. Mines that are running on reduced time will probably have to curtail working hours still further. Indiana mines are more affected by this congestion of traffic than those of Illinois.

Prices of bituminous show little or no change from last week. Lump, Indiana and Illinois is $2.25@$3; run-of-mine, $1.90@$2.25, and screenings are $1.20@$1.75. The demand for western coal continues greatest in the less expensive grades. Hocking is unchanged; it is in steady and fair demand and is kept well up to list prices, $3.80 for steam lump, $3.90 for domestic lump and $3.65 for run-of-mine. Smokeless continues on the ragged edge; Pocahontas keeps well up to the circular prices of $4.35 for lump and egg and $3.90 for run-of-mine, but other grades of smokeless are cut by 25@50c., and there is doubtless some Pocahontas to be had at cut rates. There is a good demand for cannel coal, at $5@$5.50, due to colder weather.

Cleveland. Oct. 27.

(From Our Special Correspondent.)

The coal trade in this territory has been rather dull, and producers and dealers are trying to advance prices, but have not been able to do so. Steam coal is selling in Cleveland now at the lowest prices in several years, and some producers claim that there is no profit. Run-of-mine of the Pittsburg vein is selling, delivered in Cleveland, now at $2.15, from which is subtracted $1 for freight. Other coals are selling on a commensurately low basis, especially coals of that grade. The reports are that the market is very narrow. and the production great, either of which elements would tend to put the prices down. All slack coals are selling here on the basis of 50c. a ton at the mines.

Domestic coal is faring much better. Massillon good stove coal is selling to the dealers in Cleveland at $3.50, and to the consumers at $4.75. The prices have not varied for some time. The market in that grade has been somewhat curtailed by the introduction of natural gas, which is finding a wide patronage.

The lake coal market is getting pretty well congested. The movement of coal has been very light for the past few weeks, and is even worse now. The upper lake docks are overcrowded, and the market is weak. The rates of transportation on this coal have remained unchanged.

The coke market is inclined to be quiet. The demand has about kept pace with the lessened production. Shipments from the ovens being free, the consumption has about kept pace, with none of the furnaces suffering. The prices have not changed, good 72-hour foundry coke bringing $3 at the oven

and other cokes high in sulphur being quoted $2.75 at the oven.

Pittsburg. Oct. 27.

(From Our Special Correspondent.)

Coal.—A shortage of railroad cars is again seriously affecting the coal trade. Prices are firmer than at any time since the schedule went into effect on April 1. The demand is increasing and in a number of instances premiums are paid for prompt shipment. The Pittsburg Coal Co. is rushing shipments to the lake ports for the northwestern trade and the local demand is left almost entirely to the Monongahela River Consolidated Coal & Coke Co., the Pittsburg & Buffalo, and the Manufacturers' & Consumers' Coal companies. The price of slack, which was down to 60c., has advanced and 75c.@80c. is now being paid. All the river coal mines are active, but the railroad mines are not being operated steadily on account of a scarcity of railroad cars.

Connellsville Coke.—Production continues to decline and prices also are lower. A strong effort is being made to maintain better rates. The independent producers have combined to keep prices from going any lower. At a meeting held in the offices of the Whyel Coke Co., at Uniontown, it was agreed that no coke should be sold for less than $2.75 a ton for foundry, and $1.90 for furnace coke. Twenty-three operators attended the meeting. The *Courier* in its last report announces that of 22,590 ovens in the Connellsville region 17,214 are active and 5,376 are idle. The production for the previous week was 182,578 tons, a falling off of 15,481 tons. The shipments aggregated 8,129 cars, distributed as follows: To Pittsburg and river points, 3,601 cars; to points west of Pittsburg, 3,161 cars; to points east of Connellsville, 1,367 cars.

San Francisco. Oct. 24.

(From Our Special Correspondent.)

The coal market continues quiet, but generally steady. There is no special feature to report.

Quotations show very little change. Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle & Bryant, $6.50; Beaver Hill and Cos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite; $8.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is slightly nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite; $8.50 for cannel; $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Oct. 28.

The coal production of Germany for the eight months ending August 31, is reported as below, in metric tons:

	1902.	1903.	Changes.
Coal	69,320,465	75,917,577	I. 6,597,112
Brown coal (lignite)	27,055,651	28,057,094	I. 1,901,443
Total mined	96,376,116	104,874,671	I. 8,498,555
Coke made	5,381,100	7,512,032	I. 2,130,932
Briquettes made	5,793,837	6,656,033	I. 862,196

This shows a very considerable increase this year, in the coal mined.

Exports of fuel from Germany for the eight months ending August 31, were as follows, in metric tons:

	1902.	1903.	Changes.
Coal	9,957,903	11,199,947	I. 1,242,044
Brown coal	14,016	15,531	I. 1,515
Coke	1,298,237	1,678,734	I. 380,497
Totals	11,270,156	12,894,212	I. 1,624,056

The chief exports were to Austria, Holland and Belgium.

Imports of fuel into Germany for the eight months ending August 31 were, in metric tons:

	1902.	1903.	Changes.
Coal	4,069,277	4,362,301	I. 293,024
Brown coal	5,133,974	5,235,436	I. 101,462
Coke	238,180	284,671	I. 46,491
Totals	9,441,431	9,882,408	I. 440,977

The chief imports of coal were from Great Britain; of brown coal from Austria; of coke from Belgium.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of October 16, that the Welsh coal market remains quiet and inactive, with prices unaltered. Quotations are: Best Welsh steam coal, $3.72; seconds, $3.60; thirds, $3.46; dry coals, $3.36; best Monmouthshire, $3.30; seconds, $3.24; best small steam coal, $2.10; seconds, $1.90; other sorts, $1.80.

The above prices for Cardiff coal are all f. o. b Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The outward freight market is quieter—rates unchanged. Some rates quoted from Cardiff are: Marseilles, $1.30; Genoa, $1.20; Naples, $1.14; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.52; Santos, $2.76; Buenos Aires, $2.28.

IRON TRADE REVIEW.

New York, Oct. 28.

The iron trade seems to recover very slowly, if at all. The buying that was brought about by some recent reductions in prices has been checked and consumers seem to have made up their minds once more that prices have not yet reached the bottom. It must be confessed that this belief is supported by the action of sellers. Southern prices have gone all to pieces, and it is a general scramble for business. Northern furnaces are not quite in such a bad way, nevertheless, sales are being made at such varying prices that it is difficult to make exact quotations. In steel billets, also, there is a good deal of uncertainty. The Billet Association has refused to reduce its base price, but outside concerns have been selling billets as low as $25 for bessemer and $26 for open-hearth. Under these conditions the buyer who holds back is certainly not to blame.

In finished material the chief incident of the week is the continued war in bars. Iron bars have been sold at varying prices, quotations as low as 1.40c. having been made. So far makers of steel bars have succeeded in maintaining prices, but their sales have been very small.

Perhaps the best portion of the market is that for structural material, which has recovered from some of its depression, chiefly owing to the certainty that several large orders must be placed between now and the close of the year, as the material will be needed by early spring.

The movement for reduction of output of pig iron has, in some places, gone beyond the expectation of its managers. In the Pittsburg district, for instance, it is estimated that 45 per cent of the furnaces will soon be out of blast. Of course, this is partly due to the fact that a number of furnaces have been run very hard during the past two or three years, and must go out very shortly for repairs. In the South, there does not seem to be a general agreement, and little has been done in reducing production.

Birmingham. Oct. 26.

(From Our Special Correspondent.)

Iron men in the Birmingham district when asked as to the pig iron market situation said: "It is just a scramble." It is admitted that there are numerous sales being made but they are in small lots and prices are far from being steady. Since the disruption of the Southern Furnace Association the price schedule has been off entirely. The scramble for business is said to have caused reductions in iron prices which have brought that commodity down to a close margin. None of the furnacemen in this district will give open quotations, but inquiries show that No. 2 foundry is selling from $10 to $10.50. None of the furnacemen admits selling that grade at $10 per ton, though rumors have it that some sales at that price have been made. A refusal is said to have been made on an offer for 600 tons of No. 3 foundry, at $9.80 per ton, which would indicate that $10 is about as cheap as that grade can be purchased.

The disruption of the Southern Association, it is claimed, has not broken the agreement for curtailment of production; but so far no effort has been made to carry into effect the provisions of that agreement. The plan was to reduce the output 25 per cent. Mr. W. H. Hassinger, vice-president and southern manager for the Republic Iron & Steel Co., in Birmingham, was a member of the committee named to arrange the details, and his absence from the city all last week is said to have hindered the carrying out of the agreement. The Talladega furnace, belonging to the North Alabama Coal & Iron Company, has been out of blast now for the past two weeks, necessary repairs being made.

Casual inquiry reveals the fact that the sales, though in small lots, are about equal to the production in this section. There is not much car shortage as yet, if any, and the furnace companies begin to have hopes that all their demands for cars will be met by the railroads.

According to the report of the Southern Iron Committee, the Southern territory shipped out 137,089 tons of pig iron, cast-iron pipe, steel rails and billets during the month of September. The territory includes the Anniston, Birmingham, Chattanooga, Greensboro, Middlesboro, Nashville and Sheffield districts. The iron and steel shipments amounted to 122,696 tons, while those of cast-iron pipe were 14,393 tons. The shipments for October will show a falling off, as during the first 10 days there was practically nothing done, as the furnacemen were holding back until the reduced freight rate went into effect. The steel rail shipments last month amounted to 2,545 tons.

There is fairly good work being done in the rolling mills in this district, and the demand for finished iron and steel is picking up. During the past week, after a conference lasting six days, a contract was made by the Tennessee Coal, Iron & Railroad Co., and the Republic Iron & Steel Co., with the Amalgamated Association of Iron, Steel and Tin Workers for the plate mills. The plate departments of the Birmingham and Bessemer rolling mills have been idle since June 27, but started up this morning again.

Foundries and machine shops are doing fairly well, with indications of steady conditions through the balance of the year.

Conditions are unchanged at the steel plant at Ensley. The production is still quite healthy. The new steel plant being erected at Gadsden, Ala., by the Alabama Steel & Wire Co., is making considerable headway.

Chicago. Oct. 26.

(From Our Special Correspondent.)

The downward pressure of the pig iron market is becoming too great for local furnaces; five of them—including three of the Illinois Steel Co.—have gone out of blast in the last week, and there will be others to follow. It looks as if a general readjustment must occur before the closed furnaces will start again. The disruption of the Southern Association seems to have had a demoralizing effect on sellers of southern, though the downward movement was apparently a cause rather than an effect of the breaking of the combination. To local agents it looks as if the crisis in southern had come and with it the necessity of a general readjustment of production to changed conditions of consumption, all over the country. In the last week southern has sold for $14@$15, Chicago, and northern has been $1 to $2 higher. Orders for northern iron continue small and the pressure for quick delivery accounts for the higher price. With the clearing out of the large stocks in the South at the present low prices, something like equilibrium may come about locally for as long as northern furnaces continue in blast at all, but the downward movement seems likely to extend to northern soon as much as to southern. Users of iron confidently predict a drop of $1, at least, below present prices before the minimum is reached and are holding off until the last moment before placing orders. Under these conditions a reaction seems probable only through a sweeping curtailment of production of iron until there comes a rising market strong enough to bear upon it all the depressing influences that now are so powerful.

Cleveland. Oct. 27.

(From Our Special Correspondent.)

Iron Ore.—The estimated movement of iron ore down the lakes during the month of October is 2,250,000 tons, which is a considerable falling off from the showing last year, and even a greater percentage of decline than that which was noted in the movement during September. The lake trade is flooded with boats and any amount of wild ore could be moved, were the shippers disposed to do so, but their needs lessening and the docks being congested, the shipments are falling off. The total for the year will not exceed 25,000,000 tons. The rates of carriage remain unchanged, being based on 80c. from Duluth. The prices are unchanged at $4.50 for bessemer old range as a basis.

Pig Iron.—The demand for foundry is beginning to be a little heavier. Sales of 500 and 1,000 ton lots for delivery during the remainder of the year have been heavy and the market steady. A few inquiries have been received for material for 1904 delivery. These have been mostly for southern iron, although some have appeared for northern iron. The market for spot shipment does not seem to be so urgent just now, as it has been in the recent past. Some of the foundries have been curtailing their production and have dismissed some of their moulders. The market is easy at prices which are now considered the bottom. Northern furnaces are firmly established on the basis of $14.50 in the Valley for No. 2. The southern furnaces after having dropped temporarily to $10 for No. 2 Birmingham base have come back to the basis of $10.75 Birmingham.

The bessemer and basic markets are peculiarly dull. The market has hardly been more quiet in this territory in years than it is now. No inquiries have been received in either trade and no sales have been made. It is impossible to quote either of these materials.

Finished Material.—The market has been centered in the bar iron trade again. Bar prices have sagged until 1.40c. delivered is about the price in the Cleveland market. There have been fears expressed that another decline was immediately ahead, and, while the mills have taken no concerted action to uphold the prices, the market is nevertheless established upon a firm basis, to all appearances at present. This situation in iron for steel has been going on steadily. The steel prices have been steady, regardless of the violent efforts which have been made to break them. The agricultural implement makers, who have been in session in this territory for the past weeks are much opposed to contracting, even when the market is guaranteed them, holding off for a straight reduction in price, which they are confident will come. Some of them expressed pessimistic beliefs as to the future of the trade in this territory. The market holds regardless of the light

trade and the antagonistic attitude of the consumers at 1.60c., Pittsburg for bessemer and 1.70c., Pittsburg, for open-hearth. The billet trade has been active. The inquiry for material has been heavy, but the smaller mills have been getting the business, because they are holding for $26 Cleveland for bessemer 4 x 4, and are not disposed to assess anything extra for billets for forgings. The pool holds firmly for the higher prices, refusing to shade them in the least. The inquiry for rails has been in small lots, some orders appearing for 500-ton lots, but no contracts have been placed. Sheets are still dull, with the smaller mills getting the major portion of the business, since they are making concessions in prices from the association lists of $2 and $3 a ton. The nominal basis is still 3.05c. for No. 27 black sheets out of stock. Plates and structural shapes have been dull, the ship-builders trying to break prices that they may induce the building of some ships. The mills are holding steady, nevertheless. The market is dull with prices holding at 1.60c., Pittsburg.

New York. Oct. 28.

Pig Iron.—The fall in prices, in spite of restricted outputs, naturally makes buying light. We quote: No. IX foundry, $15.75; No. 2X, $15, while No. 2 plain can be had for 50c. less; gray forge, $14. For Southern iron on dock, quotations are: No. 1 foundry, $15; No. 2, $14.

Bar Iron and Steel.—The market is quiet. Prices for large lots on docks are: Refined bars, 1.55@1.60c.; soft steel bars, 1.70@1.80c.

Plates.—Buying is still in small lots. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.83c.; flange, 1.95@2.05c.; marine, 2.10@2.15c.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight.

Structural Material.—There is no improvement in demand. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees.

Philadelphia. Oct. 28.

(From Our Special Correspondent.)

Pig Iron.—While there have been no actual reductions in quotations during the past few days, the business done in pig iron has been at the minimum rates, for which in several instances a better grade of iron was secured than a week ago. The confidence of foundry and forge iron customers in steady prices seems to have been broken up. On two or three occasions they came to the conclusion that the lowest point was reached, only to be surprised by further reductions, and by sales at the reduced figures. About the only business that has been done this week was in No. 2. Unexpected inquiries for basic were received and it is probable that some large orders will shortly be placed. A careful investigation of large consumers' yards shows that a moderate demand must develop itself from this out. Quotations may be given at $16.50 for No. 1, $14.75 for No. 2, $14.50 for No. 2 plain; $14 for gray forge, down to $13.25 for the poorest stuff on the market.

Billets.—Two or three large consumers of billets have suddenly withdrawn their negotiations, in consequence of a rumor that a cut in billets is to be made. Up to this writing it appears to be without foundation, but the starting of the rumor has had the effect of putting buyers on their guard. Lowest quotation heard of to-day $26, in large lots. It was thought a week or two ago the acceptance of this price in small lots would lead to business, but it has not, so far.

Merchant Bar.—There is quite a wide range in prices of refined bars and steel bars. Some mills have secured business merely to keep going at a price which affords no margin. There is a belief among a good many small mill owners that bar iron users will accumulate some stock for the winter between now and the end of the year and they are willing to hold off for this hoped for improvement. Bars have sold as low as 1.40c. and as high as 1.60c.; steel bars nominally 1.75c.

Sheets.—Some manufacturers are endeavoring to negotiate with parties who are in the habit of placing large orders about this time of the year. It is all a question of price. The retail trade continues at a satisfactory rate.

Skelp Iron.—The skelp mills are bidding very urgently for business in the hope of securing some of the work now hanging along the borders of the market. There is quite a scramble for this work in western Pennsylvania.

Merchant Steel.—Quite a number of consumers of merchant steel have placed orders within a few days for tire, spring, open hearth and tool steel. The presumption is that their views were complied with as to price.

Pipes and Tubes.—Slight shadings are to be had in pipes and tubes, provided the orders are large enough. Agents of mills have done considerable canvassing this week in this direction, with a view of closing up large orders which mills are very anxious to secure.

Plates.—It is impossible to note a single phase that is deserving of notice. No change in quotations.

Structural Materials.—Representatives of mills have, within a day or two, had some correspondence with reference to large railroad bridge requirements, but the negotiations are too young to draw any inferences. Quotations, 1.85c.

Steel Rails.—The rail market is quiet, the only recent transactions being in light sections and in girder rails, for which the inquiry is quite steady.

Old Rails.—Old steel rails found buyers this week at $14 for a small lot or two. Iron rails are available at $18, but none have changed hands.

Scrap.—The scrap market is declining quietly and the demand is unimportant.

Armor Plate.—Our Midvale Steel Co. has secured a contract for 6,000 tons of armor plate, and will proceed to erect a plant to supply the product.

Pittsburg. Oct. 27.

(From Our Special Correspondent.)

Conditions in the iron and steel industry are improved this week. This is indicated by the starting of a number of mills that had been closed through lack of orders. Delayed orders are gradually being placed and the outlook is believed to be somewhat brighter than a week or two ago. But little new business is coming in, however, the starting of idle mills being due to an increase in specifications on old contracts. The 35 and 40 in. plate mills at the Homestead works of the same company, situated at Youngstown, were for two weeks, resumed operations on Sunday night, and the 128-in. mill, which has been on single turn for over a month, went on in full. The big Ohio works of the same company, located at Youngstown, were started in all departments except the rail mill, yesterday. The plant had been closed for one week. Half of the Brown-Bonnell plant of the Republic Iron & Steel Co. at Youngstown, was put in operation yesterday, and it is expected that the entire plant will be on before the end of the week. The Union plant, also at Youngstown, formerly operated by the American Steel Hoop Co., now under the control of the Carnegie Co., resumed in full yesterday and will continue for an indefinite period. It is reported that the Warren mill of the same company soon will be put in operation. A number of plants in the Pittsburg district are operating more fully than a week ago. The McKee's Rocks and the Allegheny plants of the Pressed Steel Car Co. will be started in full tomorrow, enough orders having been received to keep them busy for at least four months. Over 1,500 men who have been idle for some time have been ordered to return to work. It appears that the United States Steel Corporation has begun active negotiations looking towards heavier exports of finished steel products. It is said the starting of the idle plate mills at Homestead is due to the company having received an order from Ireland for 100,000 tons of plates. There has been a good export business in wire products and in pipes and tubes and trade in these lines is increasing rapidly. It is reported that considerable Mexican business is in sight. The American Tin Plate Co. has succeeded in capturing a lot of rebate trade and the prospects for the operation of most of the plants throughout the winter are very encouraging. As already explained the tin-plate workers, members of the Amalgamated Association of Iron, Steel and Tin Workers, have made a concession of 3 per cent in wages to enable the company to get this business. The collection of this fund, which was discontinued on June 1, was resumed on October 1. It is paid into the Amalgamated Association and the company is allowed 25 per cent of the labor cost from the fund on every box of tin-plate that goes into the rebate or foreign trade. It is announced that the Shenango works at New Castle will be started on November 9, and if the negotiations now on for outside business are successful it is believed all the plants of the company will be in operation on that date or about the middle of the month. Five mills of the Sharon plant were started yesterday, and the works will be in full operation tomorrow.

There is but little change in the pig iron situation. So far it is estimated production has been curtailed about 45 per cent, many furnaces preferring to close early in the quarter. Chairman J. G. Butler, Jr., of the Bessemer Furnace Association, in charge of the restriction movement, believes this percentage should be kept up throughout the last quarter and has addressed circulars to producers asking their views on the matter. It is thought that much benefit may be derived by restricting production about 40 instead of 25 per cent as agreed upon. Arrangements are being made for a meeting of furnace interests to act on the matter. It will be held next week. No bessemer iron has been sold during the week, but there was a fair tonnage of foundry iron. Nothing is doing in gray forge. Prices in most finished lines are being fairly maintained. It is reported that one large concern is shading hoop prices to a certain extent. There is a steady moderate demand for structural material and plates and prices are firm. The heavy demand for merchant pipe continues, but there is a falling off in orders for certain small sizes. The wire trade is remarkably good. John Pierce, assistant president of the Amalgamated Association, returned yesterday from Birmingham, Ala., where he spent last week in conference with representatives of the Republic Iron & Steel Co. and the Tennessee Coal, Iron & Railroad Co. on the wage scale for the plate mills. The mills of these two companies in the South have been idle since July 1. Mr. Pierce said a satisfactory adjustment was made and that the mills will immediately be put in operation.

Pig Iron.—Sales of Southern foundry iron in the Pittsburg district during the week aggregated about 1,500 tons. The price reported is $10.75, Birmingham, or $15.10 delivered at Pittsburg. Northern foundry No. 2 is held at $15.25, Pittsburg. These low prices, however, are not quoted for future delivery. Bessemer iron is remarkably weak, being offered as low as $15, Valley furnaces, and none was sold even at that figure. There is but little business being done in gray forge, and it can be had at prices ranging from $14 to $14.50, Pittsburg.

Steel.—Reports continue of cheap billets being offered, but the association is adhering strictly to the agreed price of $27 for bessemer and $28 for open-hearth billets. Small lots of open-hearth are being offered by independent plants at $25 and $26. Steel plates and bars continue to be quoted at 1.60c.

Sheets.—Sheets are fairly active, with a slight tendency toward lower prices. Black sheets, No. 28 gauge, are still quoted at 2.70@2.75c., and galvanized at 3.80@3.85c.

Ferro-manganese.—There is no change in the market, domestic 80 per cent still being quoted at $48.

Cartagena, Spain. Oct. 10.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—There were two cargoes shipped this week, 3,800 tons dry ore and 1,800 tons manganiferous ore; both were to Great Britain. The market continues very dull, and production is being somewhat curtailed in order to prevent accumulation of stocks. There are some inquiries for contracts for 1904 delivery, but in most cases sellers are holding out for higher prices, as the outlook for the coming year is considered hopeful. Freights remain high, as is usually the case at this season of the year, latest rates paid having been 8s. 3d. Cartagena-Maryport, 7s. 1½d. Cartagena-Androssan.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f. o. b. Cartagena. No shipment reported.

Other Shipments.—Other exports include 10,780 kgs. ocher to Liverpool.

CHEMICALS AND MINERALS.

(See also Price-Current on page 684.)

New York, Oct. 28.

Aside from the new contracts for a few specialties, business is uninteresting and in certain circles the "election fever" is beginning to take hold. Some unrest is being felt as a result of labor troubles, and other depressing circumstances, in industries upon which the chemical and mineral trades are dependent. Hope, however, is entertained for an early improvement, though this may be postponed until the turn of the new year.

Cyanide.—A small shipment of potassium cyanide has been made from New York to Halifax, N. S., and two larger parcels are reported for Colon. Sellers in New York still quote on the basis of 20c. per lb.

Bleaching Powder.—Consumers have placed some large contracts over next year on the basis of $1.25 per 100 lb. for English and American at New York, and $1.20 for Continental. Momentarily the spot market is quoted about the same, but business is too small to attract attention.

Copperas.—Further contracts have been taken for shipment up to July next at 47½ per 100 lb. for bulk, and 52½c. for barrels, in car-load lots.

Copper Sulphate.—At least one large seller is out of the market and cannot quote. Others report a fair demand at $4.75@$4.80 per 100 lb. f. o. b. works.

Acids.—Oxalic shows some contracts for 1904 delivery at $5 per 100 lb. f. o. b. New York for German and British, and $5.25 for Norwegian. There is a tendency among sellers to ask a fractional advance, but consumers seem unwilling to acquiesce. It cannot be disputed, however, that a price of $5 brings profits

down to a narrow margin. Sulphuric and muriatic acids are in better request.

We quote, as below, per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l	$5.00@$5.25
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14 50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—Recent arrivals have not only satisfied regular contracts, but have been large enough to cause a pressure to sell, easing prices. Spot best unmixed seconds are offered at $23@$23.50 per ton, same as near-by arrivals. Nothing special doing in futures, which are quoted at $22.25@$22.50. Best thirds are nominally $1.25 less than seconds.

Pyrites.—Business is seasonable, and prices continue unchanged, as deliveries are principally on long-time contracts.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies, from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@12c. per unit for lump, and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—The *Anglo-Saxon* arrived at New York with 65,896 bags. Sales from this steamer have been made at $2.15 per 100 lb., while futures are held at $2@$2.05, according to position.

On October 26 the San Jorge Nitrate Company paid an interim dividend of 2½% (48c. per share) for the half-year ended June 30 last.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write under date of September 5, as follows: Nitrate of soda has been in demand during the entire fortnight, especially for 95 per cent delivery up to November 1, and several parcels have changed hands at 6s. 11½d.@7s. 10½d. alongside. One sale for December was effected at 6s. 11d. alongside, and no inquiry has been shown for next year's delivery of 95 per cent at prices asked by producers. In 96 per cent transactions have been effected for November-December at 7s., and afterwards for January-February deliveries at the same price. April-September has been done at 6s. 9¼d., and May-December at 6s. 9d., all alongside terms. The exports for August were 2,811,000 qtls., making a total for the first eight months this year of 17,140,000 qtls, against 17,486,000 qtls. in the corresponding period last year. We quote 95 per cent, September-October, 7s.; November, 6s. 11½d.; December, 6s. 11d.; January-February, 6s. 9½d.; and 96 per cent, 7s. 1½d., September-November; 7s. 0½d., December; 6s. 11½d., January-March, all ordinary terms, sellers. The price of 7s., with an allround freight of 15s., stands in 8s. 6¾d. per cwt. net cost and freight, without purchasing commission. Reported sales are 512,000 qtls, and resales, 22,000 qtls., for the fortnight.

Sulphate of Ammonia.—Gas liquor is easier in price, domestic being quoted at $2.97½ per 100 lb., and foreign, $3.07@$3.10.

Phosphates.—Occasionally a new order is of sufficient size to influence opinion among exporters, but the undertone of the market indicates that present prices will be maintained, if not advanced. One good reason for expecting a stable market is the firmer ocean freight rates to leading consuming territories abroad, and another is that the cost of producing is higher. Little more than two months remain for balancing this year's business accounts, and information supports the opinion that stocks of phosphates at mines are smaller than they have been in some time. In other words, the time is approaching when miners will be better able to convince European superphosphate manufacturers, that lower prices cannot be expected for next season's shipments. This is not only the situation here, but it seems also to prevail in foreign producing centers, especially in Africa, where miners are pretty well sold up for some time ahead. The unfortunate circumstance, however, is that superphosphate prices, owing to competition, are low, yielding little profit to the manufacturer. Perhaps before the turn of the new year an improvement may be shown in this direction.

Phosphates.	Per ton. f. or b	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.25@$7.50	6¾@7⅝d.	$10.53@11.70
*Fla. land peb. (68@73%)	3.75@ 4.00	5⅛@5½d.	7.70@ 8 05
†Tenn. (78@82%) export	4.00@ 4.25	6⅛@7d.	10.40@11 20
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn. 75% domestic	3.50	.....	.....
†Tenn. 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡So. Car. riv. rk. (55@63%)	2.75@ 3.00	4⅝ 5⅛d.	5.55@ 6.60
Algerian (63@70%)	.....	5⅛@6⅛d.	7.37@ 8.38
Algerian (58@63%)	.....	4⅝@5⅛d.	5.55@ 6.90
Gafsa (Tunis)	.....	5⅛@6d.	6.30@ 7.20
Christmas Isl. (80 85%)	.....	7⅛@8⅛d.	12.38@13.61

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Oct. 14.

(Special Report of Joseph P. Brunner & Co.)

Trade in heavy chemicals is still quiet, while prices are steady. For soda ash, caustic soda and soda crystals makers are now quoting over 1904, on same basis as for spot delivery.

Soda ash is well controlled by makers and quotations are unchanged at the usual range as to market. For tierces nearest values may be called about as follows: Leblanc ash, 48 per cent, £5@£5 10s.; 58 per cent, £5 10s.@£6 per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s. @£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces.

Soda crystals are moving off steadily at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for a few favored markets.

Caustic soda is in moderate request and prices are firm, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10; 76 per cent, £10 10s. per ton, net cash. Special quotations for export to the continent and a few other export quarters.

Bleaching powder is depressed on spot and quotations are nominal at about £3 10s.@£4 per ton, net cash, for hardwood, as to destination.

Chlorate of potash is quiet at 2¾d. per lb., net cash, for English make.

Bicarb. soda is unchanged and selling at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special terms for a few favored markets.

Sulphate of ammonia is steady at about £12 10s.@ £12 12s. 6d. per ton, less 2½ per cent for good gray 24@25 per cent in double bags f. o. b. here. The labor question in the Scotch shale industry is still unsettled and prices of sulphate will no doubt be governed very much by how the events turn out in the North, as a strike or lock-out in the shale district would curtail the production of sulphate to a considerable extent.

Nitrate of soda is slightly easier for ordinary, owing to arrivals, but refined is still scarce and held for full prices. The spot range is about £10@£10 10s. per ton, less 2½ per cent for double bags f. o. b. here, as to quantity and quality.

METAL MARKET.

New York, Oct. 28.

Gold and Silver Exports and Imports,

At all United States Ports in September and Year.

Metal	September. 1902.	September. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$530,029	$998,076	$30,996,319	$41,536,851
Imports	4,981,130	5,184,858	24,906,492	31,640,672
Excess	I. $4,451,101	I. $4,186,782	E. $6,089,827	E. $9,896,179
Silver:				
Exports	4,635,803	2,368,015	35,580,539	24,908,435
Imports	2,399,407	1,687,239	18,703,844	16,601,269
Excess	E. $2,236,396	E. $680,776	E. $16,876,695	E. $8,307,166

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending October 21, and for the years from January

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week	$25,000	$26,266	$1,370,965	$1,924	$1,367,775
1903	31,547 990	6,?98,110	25,931,761	3,135,152	47,646,498
1902	24,755,518	3,25?,326	21,920,129	960,446 E.	42,456,875
1901	26,108,329	4,055,333	25,524,100	3,146,985 E.	44,430,281

The above statement includes Mexican and other foreign silver in coin or bullion.
The heavy silver exports were almost wholly to London, and in bullion.

General business is somewhat more quiet, but still generally in good condition. London bankers are preparing for shipments of gold to New York, which are expected; but it does not seem probable that any gold will come just yet.

Imports of gold and silver at San Francisco for the nine months ending September 30 were as follows:

	Gold.	Silver.
Coin	$5,632,012	$84,424
Bullion	906,494	1,629,257
Totals	$6,538,506	$1,713,681

The larger part of the gold came from Australia; most of the silver from Mexico.

Exports for the nine months are reported as follows:

	Gold.	Silver.
Coin	$564,236	$628,989
Bullion	1,205,627	979,000
Totals	$1,769,863	$1,607,989

Exports of silver were chiefly to China. They have been unusually light so far this year.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending October 24, gives the following totals, comparison being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$884,589,700	$870,977,600	$907,099,000
Deposits	954,496,100	882,685,300	889,714,600
Circulation	31,763,200	40,128,900	45,862,600
Specie	182,942,800	169,032,500	171,706,600
Legal tenders	70,394,400	69,420,300	68,666,560
Total reserve	$253,337,200	$238,452,800	$240,373,100
Legal requirements	238,624,025	220,671,325	222,428,650
Balance surplus	$14,713,175	$17,781,475	$17,944,450

Changes for the week this year were increases of $139,400 in circulation, $161,200 in legal tenders, and $511,200 in surplus reserve; decreases of $1,166,500 in loans and discounts, $2,056,800 in deposits, and $164,200 in specie.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd	$169,032,500	.....	$171,706,600	.....
England	170,283,425	.....	163,131,350	.....
France	509,322,040	$221,882,760	485,942,460	$221,588,995
Germany	164,510,000	60,845,000	172,015,000	60,440,000
Spain	71,510,000	97,245,000	72,600,000	96,220,000
Netherlands	23,451,000	32,223,500	20,282,000	31,608,500
Belgium	15,696,665	7,848,335	15,540,000	7,770,000
Italy	81,040,000	10,226,000	101,560,000	11,996,000
Russia	357,525,000	33,890,000	384,460,000	34,400,000
Austria	228,545,000	61,130,000	229,015,000	61,720,000

The returns of the Associated Banks of New York are of date October 24, and the others October 22, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The high price of silver was not maintained last week, owing in a measure to the announcement that the Government would cease to buy on account of Philippine coinage. Oriental banks did some reselling, and this had the effect of lowering the price. Demand at present is moderate and price is quiet.

The United States Assay Office in New York City reports receipts of 31,000 oz., silver for the week.

Shipments of silver from London to the East for the year up to October 15 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£4,799,170	£4,778,975	D. £20,195
China	158,200	302,123	I. 143,923
Straits	390,820	721,879	I. 331,059
Total	£5,348,190	£5,802,977	I. £454,787

Receipts for the week were £41,000 in bar silver from New York, and £8,000 from Australia; total, £49,000. Shipments were £128,000 in bar silver to Bombay, and £10,000 to Calcutta; total, £138,000.

Indian exchange is somewhat easier, but the Council bills offered in London were taken at 16d. per rupee. Buying of silver for India continues on a large scale.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.46¼	$0.48
Peruvian soles and Chinese pesos	.43⅜	.46½
Victoria sovereigns	4.85	4.88
Twenty francs	3.88	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

October	Sterling Exchange.	Silver N. Y. Cts.	Silver London, Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter N. Y., Cts. per lb.	Spelter St. Louis, Cts. per lb.
22	4.85⅝	61⅜	28⅜	12⅝@12¾	12½@12⅝	54⅝	35¾	4.35@4.40	5.45	5.30
23	4.85½	61⅜	28 5/16	12¾@12⅞	12⅝@12¾	56⅜	26⅛	4.35@4.40	5.45	5.30
24	4.85½	60⅞	28⅛	13@13¼	12¾@13	....	26⅛	4.35@4.40	5.45	5.30
26	4.85⅝	60⅝	27⅞	13¼@13½	13¼@13⅜	59½	26¼	4.35@4.40	5.42½	5.27½
27	4.85½	60¼	27½	13½@13¾	13¼@13½	59	26 26	4.35@4.40	5.42½	5.25
28	4.85⅝	60⅝	28	13¼@13¾	13½@13½	58¼	@ 26⅛	4.35@4 40	5.42½	5.25

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

Copper.—During the week under review the market has been rather excited. The report of the closing down of all the mines and smelting works of the Amalgamated Copper Company in Montana, caused quite a sensation, and consumers rushed in to buy for early as well as forward delivery, the more so as most of them were only covered for their immediate requirements. Under the circumstances values advanced by leaps and bounds, and the market closes strong at 13½@13¾c. for Lake; 13¼@13½c. for electrolytic in ingots, cakes or wirebars, 13@13¼c. in cathodes; 13⅛@13⅜c. for casting copper.

Inasmuch as the output of the Montana mines is variously estimated at from 20,000,000 to 22,000,000 pounds of fine copper a month, it stands to reason that the future course of the market will depend to a large extent upon the duration of the shut-down. No reliable information can be obtained regarding this feature of the situation.

Europe has also been a good buyer, and exports during the months of October and November are expected to be very heavy.

The market for standard copper in London, which closed last week at £56 7s. 6d., was rushed up on Monday morning to £60, but has since reacted to £59 on Tuesday, and the closing quotations on Wednesday are cabled as £58 5s.@£58 7s. 6d. for spot, £57 15s.@£57 17s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £62@£62 10s.; best selected, £64@£64 10s.; strong sheets, £70@£70 10s.; India sheets, £67@£67 10s.; yellow metal, 6⅜@6½d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of October 27, and for the year to date, were in long tons:

	Week.	Year.
Austria	669	4,701
Belgium	18	1,105
France	25	17,015
Germany	767	22,800
Holland	1,378	32,582
Italy	5	2,424
United Kingdom	525	14,317
Other countries	2	4,548
Total copper	3,389	99,402
Matte	.....	286
Imports—		
Copper	97	21,784
Matte	.....	984
Ore	.....	35,355

Exports are larger than last week, but imports show a falling off. Of the imports 22 tons were from Japan, and the remaining 75 tons from Mexico.

Chilean Copper Market.—Messrs. Jackson Brothers report from Valparaiso, Chile, under date of September 5, that recent sales of bar copper amounted to 25,438 quintals, the average quotation being $34.50 Chilean currency, per quintal. About 1,050 tons of regulus were sold at prices averaging about $15.50, Chilean currency, per quintal, on a basis of 50 per cent copper. In copper ores no business was reported.

Tin has been quiet but steady. The arrival of the steamship *Minnehaha* with about 1,000 tons has relieved the spot situation, and for the time being the metal can be bought at about the importation price. Inasmuch, however, as there is quite a fair consumptive demand, it is expected that early deliveries will shortly again rule at a premium. At the close we quote spot at 26@26⅛c.; November, 25¾@25⅞c.

The foreign market, which closed last week at £117 12s. 6d., opened on Monday at £118 15s., declined on Tuesday to £117 15s., and the closing quotations on Wednesday are cabled as £117 15s.@£117 17s. 6d. for spot, £118 5s.@£118 7s. 6d. for three months.

Lead is dull and neglected, without any special feature. The closing quotations are 4.25@4.32½c. St. Louis, 4.35@4.40c. New York.

The foreign market is firm, Spanish lead being quoted at £11 3s. 9d.@£11 5s.; English lead, £11 6s. 3d.@£11 7s. 6d.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of October 10, that the price of silver during the week has been 14.75 reales per oz. Exchange has gone down 25c., making it 33.70 pesetos to £1. Local quotations for pig lead on wharf has been 60.25 reales per qtl., which on current exchange, is equal to £10, 0s. 3d. per ton of 2,240 lb., f. o. b. Cartagena. Exports included 400,852 kgs. pig lead, and 589,238 kgs. desilverized lead, all to London.

Spelter.—The demand for this metal is rather slack at present, and the market has been dull and depressed. The closing quotations are given at 5.25c. St. Louis; 5.42½c. New York, for shipment from the West.

The foreign market is steady, good ordinaries being quoted at £20 5s., special at £20 10s.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of October 10, that miners are still holding out for higher prices, which buyers find it impossible to pay, taking into account the price of spelter and the falling tendency of exchange. No shipments for the week.

Antimony is quiet. We quote: Cookson's, 7@7¼c.; Hallett's, 6¼@6⅜c.; U. S., 6@6¼c.; Italian and French, 5⅞@6c.; Japanese, 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Demand continues steady and the price remains at $19 per oz.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations are lower, $44@$45 per flask for domestic orders and about $41.50 for export. The London price is £8 7s. 6d. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1. 99% ingots	33@37c.
No. 2. 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.
Ferro-Tungsten (37%)	38c.
Magnesium, pure (N. Y.)	60c.
Manganese	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on size of order.

Missouri Zinc Ore Market. Oct. 24.

(From Our Special Correspondent.)

At the close of this week it has developed that there is no further decrease in the prices of zinc, although the conditions appeared unfavorable earlier in the week. The highest price reported paid was $38 per ton, and the assay basis was reported at $33@$34 per ton of 60% zinc. The price of lead ore continues firm at $56 per ton.

Following are the shipments of zinc and lead ores from the various camps of the Joplin district for the week:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,018,360	319,700	$42,720
Webb City and Carterville	2,038,540	427,280	45,580
Galena-Empire	922,860	170,870	17,700
Duenweg	720,160	86,310	14,655
Granby	414,000	32,000	5,900
Zincite	310,520	7,920	5,500
Oronogo	274,550	3,460	4,795
Cave Springs	209,810	6,340	3,415
Prosperity	161,800	21,320	3,345
Alba and Neck	188,070	2,590	3,265
Aurora	179,600	10,090	3,250
Mitchell	162,090	7,900	2,965
Carthage	137,290	8,480	2,570
Spurgeon	63,880	51,840	2,055
Central City	46,640	20,770	1,140
Carl Junction	60,900	.....	1,035
Totals	8,009,070	1,176,170	$159,890
Forty-three weeks	403,066,680	47,501,770	$8,198,335

Zinc value: The week, $126,935; forty-three weeks, $6,911,125.
Lead value: The week, $2,955; forty-three weeks, $1,287,210.

On last Wednesday night a convention of producers decided in favor of a curtailment of the output until such time as the smelters were in need of more ore. The proposition was so enthusiastically received that 1,800 tons were signed up by mill-owners, who pledged themselves to reduce the output that much. At an adjourned meeting on Friday night, those pledging themselves had an aggregate of 2,700, with committee out canvassing the district. On Saturday night these committees reported 3,000 tons signed and promises of the local representatives of eastern owned companies to use their utmost endeavor to bring their companies to see the situation as seen by the local producers, which, if accomplished, will reduce the output for the week beginning October 25 by 4,000 tons of zinc ore, or 80 per cent. of the total weekly output. It is estimated that this plan will reduce the present reserve stock one-half, even if only 3,000 tons are curtailed, and will remove the serious aspect of a large and growing reserve. About 25% of the output is represented in a movement to continue the curtailment still another week, provided the smelters make smaller purchases. The situation seemed very much enlivened after Wednesday night, and where there were bins of ore, upon which no price had been offered for two and three weeks, from one to four purchasing agents made their appearance and made bids. The purchasing agents of one smelter, who have been out of the market for four weeks shipped out nine cars this week and, it is reported, purchased 1,000 tons. Two other smelting companies increased their purchases 50%, while all but three made increases in their shipments and purchases.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.015	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	26.77	26.60	4.243	4.075	5.686	5.49
October	.....	26.07	.....	4.075	.....	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c, September 5.514c.

Average Prices of Copper.

Month.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.342	12.110	14.212	12.360	57.30	53.93
July	13.094	11.771	13.341	11.923	56.64	52.89
August	12.962	11.404	13.159	11.649	58.44	51.96
September	13.205	11.480	13.345	11.760	56.82	52.68
October	.....	11.449	.....	11.722	.....	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903.		1902.		1901.	
	London Pence.	N. Y., Cents.	London. Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	26.75	58.00	23.88	51.52	26.95	58.26
October	.....	.....	23.40	50.57	26.62	57.59
November	.....	.....	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
†Alaska-Mexican	Oct. 28	.10	18,000	555,381
Alaska-Mexican, extra	Oct. 28	.10	18,000	.....
†Alaska-Treadwell	Oct. 28	.37½	75,000	5,495,000
†Allis-Chalmers, pf	Nov. 2	$1.75	$284,375	$3,228,125
†Amalgamated Copper	Nov. 30	.50	769,430	22,761,400
‡Anaconda Copper	Nov. 16	.50	600,000	23,250,000
†Camp Bird, Colo	Nov. 7	.18	147,600	967,704
‡Central Oil, W. Va	Nov. 2	.25	15,000	152,500
†National Carbon, pf	Nov. 14	1.75	78,750	1,575,000
Penna. Steel, pf	Nov. 1	3.50	588,750	3,505,750
†Phila. Nat. Gas, com	Nov. 2	.75	231,406	3,416.831
†Tenn. C. & I., pf	Nov. 1	2.00	4,900	307,104
‡United Copper, pf	Nov. 2	3.00	150,000	450,000
†U. S. Steel, com	Dec. 30	.50	2,541,513	53,350,978
†U. S. Steel, pf	Nov. 16	1.75	8,929,919	98,192,496

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Belcher	Nev.	..	Nov. 17	Dec. 8	.10
Best & Belcher	Nev.	..	Nov. 6	Nov. 27	.10
Canton Placer	Cal.	..	Nov. 18	.....	.01½
Columbus, Con.	Cal.	..	Nov. 9	.....	.02
Dexter-Tuscarora Con.	Nev.	1	Oct. 22	Nov. 11	.02
Eureka Con. Drift	Cal.	38	Oct. 17	Nov. 7	.00½
Golden West	Cal.	1	Oct. 24	Nov. 18	.01
Gould & Curry	Nev.	..	Oct. 27	Nov. 13	.10
Justice	Nev.	..	Nov. 17	Dec. 5	.10
Kentuck Con.	Nev.	..	Nov. 4	Nov. 25	.03
Larkin	Cal.	15	Oct. 26	Nov. 16	.02½
May Day	Utah	3	Oct. 14	Nov. 2	.02
Occidental Con.	Nev.	43	Nov. 6	Nov. 27	.05
Red Slide	Cal.	..	Nov. 6	.....	.05
Seg. Belcher & Mides Con.	Nev.	..	Nov. 4	Nov. 24	.05
Sonora Quartz	Mex.	..	Nov. 4	.....	.00½
Willietta	Cal.	7	Oct. 27	Nov. 17	.01

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Oct. 14 H.	Oct. 14 L.	Oct. 15 H.	Oct. 15 L.	Oct. 16 H.	Oct. 16 L.	Oct. 17 H.	Oct. 17 L.	Oct. 19 H.	Oct. 19 L.	Oct. 20 H.	Oct. 20 L.	Sales.
Acacia Colo., g.	1	1,500,000									06⅛				1,000
Amalgamated Mont c.	100	1,538,879	39½	37½	38⅜	36⅛	34½	35⅝	34⅞	38⅜	35⅜	37⅝	39¼	37½	398,585
†Anaconda Mont, c.	25	1,200,000					63	58	60		62	61½	65	63	2,570
Anaconda, Colo., g.	2	1,000,000													
Andes, Nev., s.	1	100,000			.20										500
Belcher, Nev., s.	3	104,000													
Best & Belcher, Nev., s	3	100,800													
Brunswick, Cal., g.	5	100,000	.04		.04										600
Bullion, Nev., s.	1	100,000			.10		12								600
Caledonia, Nev., s.	1	100,000											1.00		100
C. K. & N., Colo., g.	1	1,500,000	.22												1,000
Con. Cal. & Va., Nev., g. s	2½	216,000	1.30		1.25		1.20		1.20		1.15	1.14	1.15		1,000
Con. Imperial, Colo., g	1	500,000													
Cripple Creek Con., g.	1	2,000,000													
Crown Point, Nev., s.	2½	100,000					18								500
Daly, Utah, g. s. l.	20	150,000			1.90										100
Elkton, Colo., g.	1	1,250,000					43	42			42		47		1,400
El Paso, Colo., g.	1	850,000													
Gold Dollar, Colo.	1	500,000													
Golden Fleece, Colo.	1	600,000											.07		800
Greene Con., Mex., c.	10	720,000	15⅜	14⅜	15⅜	15	15⅛	14⅜	17⅛	15⅜	18⅛	17	17	16¼	21,420
Hale & Norcross, Nev., s	2½	112,000					56	55							400
Homestake, S. D. g.	100	218,400											55		100
Iron Silver, Colo.	20	600,000							1.75				1.85	1.80	400
Isabella, Colo., g.	1	400,000			.12		.12				12				1,400
Jack Pot, Colo., g.	1	1,250,000			.08½	.08									1,000
Julia, Nev., s.	1	100,000							.06						1,000
Little Chief, Colo., s. l	50	200,000			.08	.07									400
Mexican, Nev., s.	3	100,800	1.10						1.00	.95					400
Mollie Gibson, Colo., g	5	1,030,000													
Moon Anchor, Colo., g	5	400,000	.13												500
Moulton, Mont., g.	25	50,000							.25						300
Occidental, Nev., s.	3	100,000													
Ontario, Utah, s.	100	150,000	5.25												40
Ophir, Nev., s.	3	100,800	1.55		1.40						1.40				200
Pharmacist, Colo., g.	1	1,500,000			.02										1,000
Portland, Colo., g.	1	3,000,000							1.10						200
Potosi, Nev. s.	1	112,000											1.15		700
Quicksilver, pf	100	43,000											6.25		50
Savage, Nev., s.	3	112,000					.26	.25					.20	.19	900
Sierra Nevada, Nev., s	3	100,000	.53										23		100
Silver Hill, Nev.	1	100,000					.65		.58						300
Standard, Cal. g.	10	178,304	2.36				3.00								200
Tenn., Tenn., c.	25	175,000	31½	.30	30¾	.30½	30¾	.30½	32½	.30½	32¼	32	30¾		6,300
Union Con., Nev., g. s	1	100,000			.60										200
Union Copper, N. C.	25	750,000	⅛	⅜	⅜	⅛							⅜		2,700
United, Mont., com., c	100	300,000	.16	.15¾	.15½	.14½	.15⅞	.15¼	.16	.15½	.16	.15¾	16¾	16¼	1,800
Virginia, M., Colo., g.	1	1,000,000							02						1,000
White Knob, Idaho, c.	10	200,000	.09¼	.09	.09¾	.09½	.10		.10¾		.10¼	.10	11		1,580
Yellow Jacket, Nev., s	3	120,000							40						300

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 453,145 shares. † Ex-dividend.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Oct. 26 H.	Oct. 26 L.	Oct. 27 H.	Oct. 27 L.
Acacia	.06¾	.06¼	.06¾	06
Am. Con.	.01⅝	.01½	.01⅝	.01½
Anaconda	.11	.10½	.11¼	.10¼
Blue Bell	.06	.04	.06	.04
Cripple Creek Con.	.03⅞	.03½	.03¾	.03½
C. K. & N.	.22	.20	.21¼	.20½
Doctor Jack Pot	.09	.08	.09	.08
Elkton Con	.44	.42	.43	.41⅝
El Paso	.53¼	.52	.53	.51½
Findley				
Gold Dollar Con.	.03¾	.03⅝	03⅞	.03⅝
Golden Cycle	.65	.63¼	.65	.63¼
Golden Fleece	.10	.04	10	.04
Gould				
Isabella	.12	.10½	.12	.10½
Jack Pot	.07	.05	.07	.05
Keystone	.03	.02½	.03⅝	.02
Last Dollar	.50	.25	.50	.25
Lexington	.03¾	.03¼	.03½	.03½
Little Puck	.03	.02	.02	.01¼
Mollie Gibson	.02	.01¼	.02	.01¼
Moon Anchor	.11	.10	.10¾	.09½
Old Gold	.10½	.10½	.11	.10⅜
Pharmacist	.03	.02½	.03	.02½
Pinnacle	.03	.02	.03	.02
Portland	1.12	1.07	1.12	1.07
Vindicator	.85	.70	.85	.70
Work	.05	.04¾	.05	.04¾

COLORADO SPRINGS, COLO.*

† Name of Company.	Par Val	Shares Listed.	Oct 17 H.	Oct 17 L.	Oct. 19 H.	Oct. 19 L.	Oct. 20 H.	Oct. 20 L.	Oct. 21 H.	Oct. 21 L.	Oct. 22 H.	Oct. 22 L.	Oct. 23 H.	Oct. 23 L.	Sales
Acacia	$1	1,500,000	.07	.06¾	.07	.06¾	.07	.06¾	.07	.06¾	.07	.06	.06¾	.06	
American Con.	1	2,000,000	.02	.01½	.02	.01½	.01½		.01½		.02	.01½	.02		
Anaconda	5	1,000,000	.12	.10¼	.12	.11	.12½	.10⅜	.11¼	.10¾	.12½	.10¼	.12	.10¼	3,000
Colo. City & Manitou	1	1,000,000	.02½	.02	.02⅜	.02			.02¾	.01¾	.02	.01½	.02¼	.01⅞	14,000
C. K. & N.	1	1,250,000	.21	.20	.21½	.20½	.22	.20½	.21½	.20	.22	.20	.22	.20	1,000
Cripple Creek Con.	1	2,000,000	.03⅞	.03½	.03⅞	.03½	.03¾	.03½	.03¾	.03½	.03⅞		.04		5,000
Des Moines	1	750,000	.03				.03		.03		.02¾	.01½	.02¼	.01⅝	
Doctor Jack Pot	1	2,900,000	.08¼	.08	.09	.08	.08½	.08	.09	.08	.09	.08¼	.08¾	.08	2,500
Elkton Con.	1	1,250,000	.48	.47	.47½	.47	.48	.46½	.50	.46⅝	.48	.45½	.45¾	.45	7,314
El Paso	1	900,000	.51	.50	.59½	.58½	.59	.58	.58¾	.57⅝	.57½	.55⅝	.55	.52¾	7,500
Findley	1	1,250,000	.14½	.14											1,000
Gold Dollar Con.	1	500,000	.04½	.03⅞	.04¼	.04	.04½	.03½	.04⅜	.03½	.04¾	.03¾	.04	.03⅝	9,295
Gold Sovereign	1	1,000,000											.03⅝	.03½	2,000
Golden Cycle	1	2,000,000	.67	.64	.66	.63¾	.65½	.63¾	.66	.63¾	.65½	.63¾	.65½	.63¾	500
Golden Fleece	1	600,000	.20	.06	.20	.06	.10	.06	.10	.06	.06¾	.05½	.06		1,000
Gould	1	1,250,000	.01						.005		.007		.007		3,000
Hart	1	1,000,000	.02		.02		.02		.03½	.02	.03½	.02	.03½	.02	
Isabella	1	3,000,000	.11	.10	.10½	.10	.10½	.10½	.10½	.10	.10¾	.10	.10¼		4,000
Jack Pot	1	1,250,000	.08	.05	.08	.05	.08	.05	.07	.05	.06¾	.05¼	.06½		1,000
Keystone	1	1,500,000											.03¼	.03	
Last Dollar	1	1,500,000	.50		.30		.50				.50		.50		
Lexington	1	1,500,000	.03¾	.03½	.03¾	.03⅜	.03¾	.03	.03¾	.03¼	.03¾	.03¼	.03¾	.03½	
Little Puck	1	2,000,000	.03	.02½	.03	.02¼	.03	.02½	.02¾	.02½	.02	.02	.02¾	.02⅜	9,000
Moon-Anchor	5	4 00,000	.12¼	.12	.12½	.12	.12¼	.11¾	.12	.11⅞	.12	.11¾	.11⅞	.11	5,500
New Haven	1	1,500,000	.02⅜	.02¼	.02¾	.02½	.02¼		.02⅜		.02⅜		.02⅜	.02¼	7,000
Old Gold	1	1,800,000													
Pharmacist, Con.	1	1,500,000	.03	.02¾	.03	.02½	.03¼	.02⅜	.03	.02¾	.03	.02¾	.02¾	.02¾	1,0.0
Portland	1	3,000,000	1.20	1.08	1.20	1 08	1.20	1.05	1.12	1.07	1.12	1.03	1.12	1 07	400
Vindicator Con.	1	1,500,000	.75	.70	.85		.85		.85		.85		.85		500
Work	1	1,500,000	.05¼	.05	.05½	.95	.05½	.04⅞	.05	.04¾	.05½	.04¾	.05½	.04¾	2,000

*Colo. Springs Mining Stock Exchange. †All gold mines in Colo. Total sales. 87,509 shares.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	October 26.	October 27.
Belcher	104,000	.15	.14
Best & Belcher	100,800	1.30	1.30
Caledonia	100,000	.96	.90
Challenge Con.	50,000	.29	.27
Chollar	112,000	.20	.17
Confidence	24,980	.60	.60
Con. California & Virginia	216,000	1.15	1.10
Con. Imperial	500,000	.03	.03
Crown Point	100,000	.16	.14
Gould & Curry	108,000	.26	.24
Hale & Norcross	112,000	.56	.54
Justice	105,000	.05	.05
Mexican	100,800	.95	.95
Occidental Con.	100,000	.23	.21
Ophir	100,800	1.40	1.40
Overman	115,200	.23	.20
Potosi	112,000	.19	.17
Savage	112,000	.23	.20
Sierra Nevada	100,000	.43	.40
Union Con.	100,000	.55	.51
Utah Con.	100,000	.18	.17
Yellow Jacket	120,000	.43	.40

COAL, IRON AND INDUSTRIAL STOCKS.

Name of Company.	Par val.	Shares Issued.	Oct. 21 H.	Oct. 21 L.	Oct. 22 H.	Oct. 22 L.	Oct. 23. H.	Oct. 23. L.	Oct. 24 H.	Oct. 24 L.	Oct. 26 H.	Oct. 26 L.	Oct. 27 H.	Oct. 27 L.	Sales
Allis-Chalmers	$100	200,000									08¼	08	08½	08¼	300
Allis-Cham's, pf	100	162,500													
Am. Agr. Chem	100	172,156													
Am. Agr. Chem. pf.	100	181,350					69								84
Am. Sm. & Ref.	100	500,000	44	41	43¾	42¼	42½	41⅜	42¼	41⅝	43⅜	42⅜	44⅛	43	30,230
Am. Sm. & Ref., pf	100	500,000	87⅛	87	87¼				87⅞		87⅝		88	87¼	980
Am. Steel Fdy	100	200,000			4½				4⅝		4½		05½	04½	1,220
Am. S. & Fdy., pf	100	200,000													
Col. Fuel & I., Colo.	100	239,310	30½	29¼	31		31⅛	28	30		30½	30	33½	30½	4,525
Col. & H. C. & I., Colo.	100	69,244					11				10¾	10	10½	10	1,450
Crucible Steel	100	250,000	4½		4¼	4	3¾	3½	4		4	3¾	4⅝	4¼	5,638
Crucible Steel, pf.	100	250,000	32	29½	30	28¼	30	29½	29¾	29⅛	30	29¾	32¾	31	8,740
Mong. R. Coal, Pa.	50	200,000							9		9				700
Mong. R. Coal, pf, Pa.	50	97,300			27½		27½		27½		27¾		27½		1,500
National Lead	100	149,054	13										13½		200
National Lead, pf.	100	149,040							75¾		76¾				210
Phila. Nat. Gas	100	308,542	36¼	35½	35¾		35½		35⅝	35½	29½		36⅜		1,332
Phila. Nat. Gas, pf.	100	212,873													
Pittsburg Coal, Pa.	100	300,307	18½	18	18	17¾	17½	16			18	16	20	18½	5,413
Pittsburg Coal, pf, Pa.	100	297,012	65	64	64	62	62½	59¾			63¼	60	64½	63½	3,361
Republic I. & S.	100	273,560	8¾	8	8	7¼	7½	7⅛			8	7⅜	8		2,100
Republic I. & S., pf.	100	204,169	57	55¼	56	51⅜	53¼	51⅜	52½	52¼	54	53	55½	54¼	11,550
Sloss-Shef S. & I., Ala.	100	75,000					26		25½				26¼	26	1,200
Sloss-Shef S. & I. pf, Ala	100	65,085			71						71				48
Standard Oil	100	970,000	6.26	6.25	633	6.30	655¾	6.38	6.58	6.56	6.65	6.60	6.70	6.65	316
Tenn. C. I. & R. R	100	225,000	30¾	29½	30	28¼	29	28⅜	29	28¼	29¾	29	30¾	29½	10,320
U. S. Red. & Ref.	100	59,188													
U. S. Red & Ref., pf.	100	39,458													
‡U. S. Steel Corp.	100	5,084,952	14½	13½	14¼	13¾	14	13⅝	13⅞	13⅜	13⅞	14⅛	14⅛	13¾	86,260
U. S. Steel Corp. pf.	100	5,103,141	59⅞	58	59⅝	58⅜	59¼	58¼	58⅞	58	62	59⅛	60⅜	59¼	183,872
Va.-Car Chem.	100	279,844	20⅝	19¾	20	19⅞			20		19½	20	20½	19½	3,400
Va.-Car Chem., pf.	100	120,000	48¾	87								88	89		300
Va. I., Coal & Coke	100	86,416	18									19			330

‡Ex-dividend. Total sales, 365,659 shares.

BOSTON, MASS.

Name of Company.	Par val	Shares listed	Oct. 21 H.	Oct. 21 L.	Oct. 22 H.	Oct. 22 L.	Oct. 25 H.	Oct. 25 L.	Oct. 24 H.	Oct. 24 L.	Oct. 26 H.	Oct. 26 L.	Oct. 27 H.	Oct. 27 L.	Sales.
Adventure Con., c.	$25	100,000			3¾	3½		3½			4⅞	4	5	4⅝	1,395
Allouez, c.	25	99,511			4¾		4⅝		5¼	4⅜	5¾	5⅛	5¼	5	1,323
Amalgamated, c.	100	1,538,879	39½	37⅝	†39	36	36⅛	34	35⅝	34⅞	38	35½	39¼	37½	48,782
Am. Gold Dredging	5	90,000											1		250
Am. Zinc, Lead & Sm.	25	60,000			7	6¼	7				7				350
Anaconda, c. s.	25	1,200,000									80		16		10
Arcadian, c.	25	150,000	90	80											155
Arnold, c.	25	60,000													
Atlantic, c.	25	100,000			7		7½		8¾	8½	8¾	8½	8¼	8	595
Bingham Con. g. s.	50	150,000	21¼		21		21		23½	22	24⅜	23¼	23¾	23	3,290
Bonanza Dev. g.	10	300,000					55								300
Breece, s. l.	25	100,000													
British Columbia, c.	5	256,800													
Calumet & Hecla, c.	25	100,000	430		430		435		450	435	4.70	4.65	4.66	4.60	177
Centennial, c.	25	90,000	14				16	15¾	18	16	18¾	17½	18	17	4,128
Central Oil	25	60,050													
Con. Mercur, g.	5	1,000,000	1		1⅛		1⅜		1¼		1⅛	1⅜	1⅛		3,731
Copper Range Con.	100	379,846	46¼	44½	45	43¼	45	42	49	44½	52	47½	49½	47	45,348
†Daly West, g. s. l.	20	180,000	39¼	38½	39	38½	39	38	38¾	38	38		38¼	38	1,207
Dominion Coal	100	150,000	73⅜	70	72	71	73	69¾	72		72½	72	72½		3,145
Dominion Coal, pf.	100	30,000	107		108								110		27
Dominion I. & S.	100	100,000	9⅞	9	9¾	9½	9¼	9			9¼	8¾	8¾		1,200
Elm River, c.	12	100,000	2½		2¾				2⅛	2¾	2⅝		2¾	2¼	685
Franklin, c.	25	100,000	7¼		7				8	7¼	8				450
Granby Con. g. s. c.	10	1,338,303			4½	4	4⅜				4¾	4			1,050
Guanajuato Con. g.	5	385,000							87½				1		150
Isle Royal Con., c.	25	385,000					6		6⅜	6	7	6¼	7¼	7	1,320
Mass Con., c.	25	100,000			4¼		4¾		5	4¼	5		4⅜		300
Mayflower, c.	25	100,000					1								50
Michigan, c.	25	100,000	6⅛						7		7¼	7	7		550
Mohawk, c.	25	100,000	37	36	36		37½	35	39	38	40⅝	39	39¾	38¾	3,425
Mont. Coal & Coke	25	200,000													
Mont'l & Boston, c.	5	570,000													
New Idria, q.	5	100,000	8½												5
Nova Scotia St. & C.	100	37,623	74¾												50
Nova Scotia St. & C., pf.	100	10,300													
Old Colony, c.	25	100,000	1												13
Old Dominion, c.	25	150,000	9⅞	9¼	9¾	9½	11¾	9⅝	13¾	11⅜	14	11	12¾	11½	8,400
Osceola, c.	25	96,150	55	53½	53¾	53	55	54	60	57	63	59¾	61	58½	2,781
Parrot, s. c.	10	229,850			17¾	17	17½	16½	19⅜	17¾	19⅝	18	19½		1,212
Phœnix Con, c.	25	100,000	3¾										4	3¾	60
Quincy, c.	25	100,000							90		96	95	95	91	137
Rhode Island, c.	25	100,000			1¼		1¼				1⅜				275
Santa Fe, g. c.	10	250,000	1⅜		2½	1⅜	2⅜	2¼	2¼	2⅛	2⅜	2⅛	2¼	2⅛	4,225
Shannon, c.	10	298,914	9½		9¾		8⅝		9½	9¼	10	9¼	9½		1,280
Tamarack, c.	25	60,000			85		85		97½	90	109.	100.	1.05	94	350
Tecumseh, c.	25	80,000													
Tennessee, c.	25	175,000													
Trinity, c.	25	160,000	6	5½	5¾	5¼	5½	5¼	6	5½	5⅞	5½	5⅝	5¼	2,430
United c.	100	450,000					15½	13							250
United States, g.	10	300,000	17½	17⅜	17⅜	17⅛	17¾	17¼	18⅞	17½	19¾	18¼	18¾	17⅝	9,144
U. S. Coal & Oil	25	240,000	9¼	9	9½	9¼	9		9		9½	9⅛	9¼	9	1,441
Utah Con., g. c.	5	231,086	26½	25¾	26	25	28¼	25½	28¾	28¼	29½	28¾	29	28	19,807
Victoria, c.	25	100,000	2¾		2½				3½		3½	2⅝	3¼	3	685
Winona, c.	25	100,000	6⅞		7	6¾			8½	7	9	8¼	8½	8¾	2,875
Wolverine, c.	25	60,000			64		65		69		70	68	69		115
Wyandot, c.	25	100,000			75				1½		1¼	1½			430

†Ex-dividend. ‡Assessment Paid. Total sales, 180,438 shares. c—Copper. g—Gold. l—Lead. q—Quicksilver. s—Silver.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Oct. 16 H.	Oct. 16 L.	Oct. 17 H.	Oct. 17 L.	Oct. 19 H.	Oct. 19 L.	Oct. 20 H.	Oct. 20 L.	Oct. 21 H.	Oct. 21 L.	Oct. 22 H.	Oct. 22 L.	Sales
Brunswick Con. g.	Cal.	$500,000	.05		.06				.05						3,000
Bunker Hill	Cal.	200,000							1.50						100
Central Eureka g.	Cal.	400, 000													
Esperanza g.	Nev.	1,000,000			.02		.02	.01	.02	.01	.01		.02	.01	38,500
Gipsy Queen g.	Nev.	750,000													500
Golconda Con. g.	Ore.	3,000,000							.18						
Gold Mt. Con. g.	Nev.	750,000													500
Hannapah g.	Nev.	1,000,000									14				1,300
MacNamara g.	Nev.	500,000			.15		.16		.15		.14				
Mizpath, g.	Nev.	1,000,000													
Montana-Tonopah, g.	Nev.	1,000,000	.96	.95	.96		.96	.95	.98	.96	.95	.94	.94	.89	6,000
N. Y. Tonopah, g.	Nev.	1,000,000													400
Oriole g.	Cal.	200,000					44								1,100
Pine Grove, g.	Nev.	1,000,000	.85	.75	.79	.78	.81	.80	.80						500
Rescue, g.	Nev.	1,000,000							.06						4,525
Tonopah-Belmont, g.	Nev.	2,000,000							1.00		.95		.97	.95	1,100
Tonopah & Cal., g.	Nev.	2,000,000					.24		.24		.27		.24		
Tonopah, g.	Nev.	1,000,000													4,500
Tonopah North Star, g	Nev.	750,000	.34	.31	.31		.32	.30	.33	.32	.33		.36		
Tonopah & Salt Lake.	Nev.	300,000													50
Tonopah Midway	Nev.	750,000											.39		
Wild Goose, g.	Al'ka	100,000													

g—Gold. *San Francisco and Tonopah Mining Exchange. Total sales, 33,325 shares.

STOCK QUOTATIONS

MEXICO.* Oct. 16

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles..	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos....	2,400	5.00	80	85
Cinco Senores y An., aviadoras	2,000	15.00	135	140
Cinco Senores y An., aviada	400	10.00	115	120
Providencia,SanJuan de la Luz	6,000	2.00	95	100
Queensland y Australia	300	.....	80	90
Guerrero:				
Delfina, 1st serie.....	2,500	.....	35	40
Delfina, 2nd serie....	2,500	.....	30	40
Garduno y Anexas...	7,200	.....	40	50
Hidalgo:				
Amistad y Condordia	9,600	8.87	75	77
Carmen, aviada.....	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	160	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora.	1,536	.....	.....	.....
La Blanca, aviada....	768	.....	.....	.....
La Reina y An., aviadora	5,600	.....	16	20
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	120	140
Maravillas el Lobo ..	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte.....	2,554	10.00	.....	.....
Refugio, aviada.....	12,800	.....	7	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	10	12
Sta. Gertrudis y An., aviadora	28,800	1.00	82	83
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	18	21
San Felipe de Jesus, aviada	1,200	.....	6	10
San Rafael y An., Trompillo	1,200	12.00	1,700	1,720
San Rafael y An., aviada	1,200	4.00	710	730
Soledad, aviada.....	960	5.00	740	750
Sorpresa, aviada.....	960	5.00	390	410
.....	...	...	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran.....	2,400	.....	2	60
Aldebarren.....	2,000	.....	85	95
Buen Despacho.....	3,000	.....	85	90
Dos Estrellas.....	3,000	30.00	2,700	2,750
La Esperanza (El Oro.).....	3,000	10.00	1,500	1,500
La Reformia, aviadores.....	2,000	.....	70	75
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, libertadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	90	.....
Michoacan:				
Luz de Borda, aviadora.....	3,000	.....	150	160
Luz de Borda, aviado.....	1,000	.....	55	70
Nuevo Leon:				
La Fraternal.....	1,000	.....	575	625
Norias de Bajan.....	1,000	.....	800	850
Santiago y An., Tlal..	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.....	3,000	.....	90	95
El Barreno, aviadora.	2,000	2.00	60	64
Sta. Maria de la Paz..	2,400	20.00	705	710
San Diegoy Annexas.	2,400	4.00	8	12
Zacatecas:				
Asturiana y An.....	2,500	.....	75	85
Candelaria y Pinos..	2,500	10.00	140	145
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	15	25
Lourdes.....	2,500	.....	20	25
Luz de Minillas, pagadoras.....	2,000	.....	95	100
Nueva Quebradilla, aviadoras.....	2,400	.....	95	100
Nueva Quebradilla, aviadas.....	600	.....	70	85
San Carlos y Annexas	2,500	20.00	120	140
Sta. Maria de Gaud..	2,500	10.00	55	65
Miscellaneous:				
Bartolome de Medina	2,000	1.50	65	70
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.).....	3,750	.....	.....	.....
La Reina (Chihuahua.).....	192	.....	.....	.....
Naica (Chihuahua.)..	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora.....	1,800	10.00	1,000	1,040
Natividad (Oaxaca) aviadas.....	600	4.00	.....	.....
San Francisco Hac...	6,000	1.00	55	60
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	3,000	5.00	210	230

*Values are in Mexican currency.

TORONTO, ONT. Oct. 24

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail, g.....	$1	.04	.02	.....
Cariboo-McKinney, g.	1	.12	.08	.....
Cariboo Hydraulic, g.	1	.75	.....	.....
Center Star, g. s.....	1	.23	.20	.....
Crows Nest, Coal & C.	100	3.50	2.80	.....
Dominion Coal, com..	100	72.50	69.00	.....
Dominion S. & I.....	100	.10	.09	.....
Fairview, g. s.....	1	.05	.02¾	.....
Giant, g. s.....	1	.03	.02	.....
Deer Trail, g. s.....	1	.02¼	.02	.....
Iron Mask, g. s.....	1	.06	.....	.....
Morrison, g. s.....	1	04	02	.....

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter.....	$10	4.50	3.60	.....
Mountain Lion, g.....	1	.28	.20	.....
North Star, g. s.....	1	.13	.08	.....
Nova Scotia Steel, com	100	.....	.....	.....
Payne, s. l.....	1	.15	.13	.....
Rambler Cariboo, g..	1	.40	.30	.....
Republic, g.....	1	.03	.01	.....
St. Eugene, g. s.....	1	.48	.40	.....
Virtue, g. s.....	1	.07	.05	.....
War Eagle Con., g. s..	1	.12	.08	.....
Sullivan, g. s.....	1	.06	.04	.....
Winnipeg, g. s.....	1	.04	.03½	.....
Wonderful, g. s.....	1	.04	.03½	.....

g—Gold. s—Silver.

SALT LAKE CITY.* Oct. 24

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax.....	10	300,000	.07	.06	2,400
Butler Liberal.....	....	.....	.14	.13½	3,045
California.....	....	.....	.....	.....	.....
Carisa	1	300,000	.13¼	.12¾	5,500
Century.....	....	.....	.57½	.51	1,900
Con. Mercur...	5	1,000,000	1.09	1.05	2,100
Daly.....	20	150,000	2.00	2.00	100
Daly-Judge	20	300,000	11.50	8.25	4,525
Daly-West.....	20	180,000	39.00	38.00	480
Emerald	....	.....	.07	.07	800
Grand Central.	1	250,000	3.70	3.70	75
Ingot	....	.....	.07½	.02½	7,000
Keystone.....	....	.....	.19	.19	66
La Reine.....	....	.....	.03	.02½	800
Little Chief.....	....	.....	.04½	.04½	2,000
Manhattan.....	....	.....	.....	.....	.....

Name of Company	Par Val	Shares	High	Low	Sales.
L. Mammoth..	20	250,000	.37½	.37½	200
May Day.....	¼	400,000	.12½	.09½	48,050
Mammoth	25	400,000	.98	.98	100
M. Washington	⅛	300,000	.02	.02	1,000
Naildriver	....	.....	1 12½	1.00	500
N. Y. Bonanza.	....	.....	.20½	.18	7,500
Northern Light	....	.....	.09½	.09½	500
Sacramento....	1	.....	.28½	.26	3,900
Silver Shield...	5	1,000,000	.....	.....	.....
Star Con.....	....	.....	.37	.33½	20,000
Swansea	....	.....	.08½	.08½	1,000
Tetro.....	1	500,000	.34½	.34	35,400
Uncle Sam Con.	....	.....	.24	.23	3,500
Victor Con.....	1	500,000	.....	.....	.....
Wabash	1	500,000	.08½	.08½	1,200
Yankee Cons..	1	500,000	.44½	.44	800

*By our Special Correspondent. All mines are in Utah. Total sales, 154,531 shares.

PHILADELPHIA, PA *

Name and Location of Co.	Par val.	Oct. 21 H.	Oct. 21 L.	Oct. 22. H.	Oct. 22. L.	Oct. 23. H.	Oct. 23. L.	Oct. 24. H.	Oct. 24. L.	Oct. 26. H.	Oct. 26. L.	Oct. 27. H.	Oct. 27. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1/16	.....	50
Am. Cement...	10	7	6¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	115
Cambria Iron, Pa	50	45½	.....	45½	.....	.....	.....	.....	.....	46	.....	46	.....	402
Cambria St , Pa	50	18⅞	18¼	19	18½	18⅞	.....	18¾	.....	18⅞	18¾	18⅞	18¾	2,227
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I. & S., Pa	5	.....	.....	¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
United Gas Imp.	50	80¼	79½	80	79¼	79⅝	78⅛	79½	79	79⅝	79	80¾	80	3,444
Warwick I. & S.	10	.....	.....	3¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Diamond Steel.	50	65	.....	65	.....	65	.....	.....	.....	5/16	.....	5/16	.....	140
Lehigh Navig'n	50	.....	.....	.....	.....	5/8	.....	.....	.....	.....	.....	.....	.....	56
Philadelphia....	50	36¾	35½	36¼	35½	36⅛	35½	36	35¾	36⅝	36	36¾	36¼	3,096
U. S. Steel.....	100	14⅜	13⅝	14⅛	13¾	13⅞	13⅝	14¼	.....	14	13⅝	14¼	14	12,635
U. S. Steel. pf..	100	59⅝	59½	59	.....	58⅝	.....	58½	62	59	.....	60⅝	59⅝	1,500

Total sales 23,840

LONDON. Oct. 16

Name and Country of Company.	Shares Issued.	Par value. £ s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
Americans:						
Alaska-Treadwell, Alaska g	200,000	5 0 0	3 0	July, 1903	4 2 6	4 7 6
Anaconda, Montana, c. s	1,200,000	5 0 0	2 0	Nov., 1903	3 0 0	3 2 6
Camp Bird, Colorado, g.....	820,000	1 0 0	9	Nov., 1903	1 3 9	1 6 3
Copiapo, Chile, c.....	112,500	2 0 0	6 10	May, 1903	1 7 6	1 12 6
De Lamar, Idaho, g. s.....	80,000	1 0 0	2 0	Oct., 1903	12 6	15 0
El Oro, Mexico, g. s.....	1,080,000	1 0 0	1 6	July, 1903	1 6 3	1 8 9
Frontino & Bolivia, Colombia, g. s...	128,662	1 0 0	3 0	July, 1901	8 9	11 3
Le Roi, British Columbia, g. s.....	200,000	5 0 0	5 0	Nov., 1899	8 9	11 3
Le Roi No. 2, British Columbia, g....	120,000	5 0 0	5 0	May, 1902	15 0	17 6
Montana, Montana, g. s.....	657,128	1 0 0	6	April 1899	1 6	2 0
Standard, Arizona, c.....	400,000	4 0	2½	Sept., 1903	3 6	4 6
Stratton's Independence, Colorado, g	1,000,007	1 0 0	1 0	Aug., 1903	5 0	5 6
St. John del Rey., Brazil, g.....	546,285	1 0 0	8	June, 1903	15 0	16 0
Tomboy Colorado, g.....	300,000	1 0 0	1 0	June, 1902	1 7 6	1 10 0
Utah Consolidated, Utah, c. g.....	300,000	1 0 0	6 3	July, 1903	4 15 0	5 5 0
Ymir, British Columbia, g.....	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
Europeans:						
*Linares, Spain, l.....	15,000	3 0 0	1 0	Mar., 1903	2 0 0	2 10 0
Mason & Barry, Portugal, c.....	185,172	1 0 0	11 0	May, 1903	3 7 6	3 12 6
Rio Tinto, Spain, c.....	325,000	5 0 0	32 6	Nov., 1903	48 15 0	49 0 0
Rio Tinto, pref., Spain, c.....	325,000	5 0 0	2 6	Nov., 1903	6 0 0	6 5 0
Tharsis, Spain, c.....	625,000	2 0 0	6 0	May, 1903	3 17 6	4 2 6
West Australians:						
Associated, g.....	495,388	1 0 0	2 0	July, 1903	2 7 6	2 8 9
Cosmopolitan Proprietary, g.....	400,000	1 0 0	1 0	May, 1903	14 6	15 6
Golden Horse Shoe, g.....	300,000	5 0 0	6 0	Apr., 1903	8 0 0	8 2 6
Great Boulder Proprietary, g.....	1,750,000	2 0	9	Sept. 1903	1 6 6	1 7 6
Great Fingall Consolidated, g.....	250,000	1 0 0	8 0	Oct., 1903	8 18 9	9 1 3
Ivanhoe Gold Corporation.....	200,000	5 0 0	5 0	Oct., 1903	8 8 9	8 11 3
Kalgurli, g.....	120,000	1 0 0	2 6	Oct., 1903	4 6 3	4 8 9
Lake View Consols, g.....	250,000	1 0 0	rts.	Aug., 1902	1 8 9	1 10 0
Oroya-Brownhill, g.....	450,000	1 0 0	... ...	.....	3 2 6	3 5 0
Miscellaneous:						
Brilliant Central, Queensland, g.....	100,000	1 0 0	... ...	.....	3 2 6	3 7 6
Briseis Tin, Tasmania.....	600,000	1 0 0	... ...	.....	4 6	5 0
Broken Hill Proprietary, N. S. W., s. l	960,000	8 0	1 0	Aug., 1903	1 9 6	1 10 0
Mt. Lyell, Tasmania, c.....	275,000	3 0 0	4 3	Sept., 1903	2 12 6	2 17 6
*Mt. Morgan, Queensland, g.....	1,000,000	1 0 0	3	Oct., 1903	2 17 6	3 0 0
Waihi, New Zealand, g.....	497,412	1 0 0	2 6	June, 1903	5 1 3	5 3 9
Kolar Gold Field, India:						
Champion Reef..	473,000	10 0	5 6	Aug.. 1903	7 11 3	7 13 9
Mysore	598,043	10 0	4 0	Nov., 1903	6 15 0	6 17 6
Nundydroog.....	484,000	10 0	1 6	Mar., 1903	2 6 3	2 8 9
Ooregum	343,000	10 0	1 9	Aug., 1903	1 10 0	1 12 6
Ooregum, pref.....	240,000	10 0	1 9	Aug., 1903	1 18 9	2 1 3
South Africans, etc:						
Angelo, g.....	600,000	1 0 0	6 0	Aug., 1903	6 7 6	6 12 6
Bonanza, g.....	200,000	1 0 0	10 0	Aug., 1903	2 6 3	2 8 9
British South Africa.....	4,436,019	1 0 0	rts.	May, 1889	2 6 3	2 7 6
Cape Copper.....	300,000	2 0 0	1 0	July, 1903	2 17 6	3 0 0
Cape Copper, pref.....	75,000	2 0 0	1 0	July, 1903	2 15 0	3 0 0
City & Suburban (New), g....	340,000	4 0 0	4 0	Aug., 1903	5 15 0	6 0 0
Consolidated Gold-Fields.....	2,000,000	1 0 0	... ...	.....	5 3 9	5 6 3
Crown Reef, Gold, g.....	120,000	1 0 0	4 0	Oct., 1903	17 10 0	18 0 0
De Beers Con., Cape Colony, d.....	800,000	2 10 0	10 0	Aug., 1903	18 18 9	19 1 3
De Beers Con., deferred.....	1,000,000	2 10 0	15 0	Aug., 1903	19 11 3	19 13 9
East Rand, Proprietary, g.....	990,000	1 0 0	5 0	Aug., 1903	7 1 3	7 3 9
Ferreira, g.....	90,000	1 0 0	15 0	Aug., 1903	19 10 0	20 0 0
Geldenhuis Estate, g.....	200,000	1 0 0	6 0	Aug., 1903	6 0 0	6 5 0
Geduld, g.....	400,000	1 0 0	rts.	Mar., 1902	6 3 9	6 6 3
Henry Nourse, g.....	125,000	1 0 0	10 0	Aug., 1903	7 15 0	8 0 0
Jagersfontein, d.....	200,000	5 0 0	6 0	Nov., 1889	28 12 6	28 17 6
Jubilee, g.....	50,000	1 0 0	5 0	July, 1903	5 0 0	5 5 0
Jumpers, g.....	100,000	1 0 0	5 0	Aug., 1899	3 0 0	3 5 0
Langlaagte Estate, g	470,000	1 0 0	3 0	Aug., 1903	3 11 3	3 13 9
May Consolidated, g.....	288,750	1 0 0	3 0	Aug., 1903	3 18 9	4 1 3
Meyer & Charlton, g	100,000	1 0 0	3 0	Aug., 1903	5 0 0	5 5 0
Modderfontein, g.....	290,000	1 0 0	rts.	Apr., 1902	8 10 0	8 12 6
Namaqua Copper, Cape Colony....	94,331	2 0 0	2 0	June, 1903	3 2 6	3 7 6
New Primrose, g.....	325,000	1 0 0	2 0	Aug., 1903	3 11 3	3 12 6
Rand Mines, g.....	1,795,958	5 0	4 0	Aug., 1902	9 8 9	9 10 0
Robinson, g.....	750,000	5 0 0	5 6	Aug., 1903	10 0 0	10 5 0
Robinson Deep, g.....	950,000	1 0 0	2 0	Aug., 1903	5 1 3	5 3 9
Rose Deep, g.....	425,000	1 0 0	2 0	Aug., 1903	7 17 6	8 2 6
Salisbury, g.....	100,000	1 0 0	2 0	Mar , 1899	1 12 6	1 17 6
Sheba, g.....	1,075,000	1 0 0	6	July, 1599	12 6	13 9
Village Main Reef, g.....	400,000	1 0 0	4 0	June, 1903	7 7 6	7 12 6
Wemmer, g.....	80,000	1 0 0	10 0	July, 1903	9 10 0	10 0 0

c—Copper. d—Diamonds. g—Gold. l—Lead. s—Silver. *Ex-dividend.

LONDON (By Cable.)*

Name of Company.	Oct. 20. £. s. d.	Oct. 27. £. s. d.	Name of Company.	Oct. 20. £. s. d.	Oct. 27. £. s. d.
Anaconda.....	3 7 6	3 10 0	Johannesburg Invest....	2 17 6	2 16 3
British South Africa.....	2 5 0	2 0 0	Modderfontein.....	8 6 3	8 12 6
Camp Bird.....	1 5 3	1 5 6	Rand Mines.....	9 7 6	9 8 9
Con. Gold Fields.....	5 12 6	5 12 6	Rio Tinto	48 17 6	50 7 6
De Beers Con. def.....	19 12 6	20 1 3	Simmer & Jack.....	1 6 3	1 7 6
East Rand.....	6 19 4½	7 0 0	Tomboy.....	1 8 1½	1 12 6
El Oro, Mex.....	1 7 6	1 7 6	.....	.....	.....

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Oct. 15

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Alameda.....	California ...	Oil.....	1,000,000	1	9.50	7.50	6.00
Auzin	France	Coal	.....	.....	290.00	5,775.00	5,790.00
Boleo.....	Lower Cal....	Copper.....	.....	500	176.00	1,360.00	1,370.00
Canadian-American	Canada.....	Coal.....	.....	20	.....	28.00	30.00
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	19.50	19.50
Courrieres	France	Coal	600,000	300	110.00	2,930.00	2,935.00
Fraser River.....	Brit. Col'mb..	Gold.....	250,000	25	.....	5.50	5.50
Huanchaca.....	Bolivia.....	Silver.....	40,000,000	125	5.00	88.00	86.00
Laurium.....	Greece.....	Zinc, Lead....	16,300,000	500	25.00	355.00	355.00
Malfidano.....	Italy	Zinc	12,500,000	500	50.00	583.00	572.00
Metaux, Cie. Fran. de.....	France	Metal dealers.	25,000,000	500	22.50	495.00	496.00
Mokta-el-Hadid.....	Algeria	Iron	18,312,000	500	40.00	839.00	839.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	485.00	484.00
Sedalia & California.....	California.....	Oil.....	1,000,000	1	.....	6.00	6.00
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	680.00	681.00
Wyoming	California.....	Oil	.....	25	.....	302.00	303.00

ST. LOUIS, MO.* Oct. 24.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	300,000	$0.10	$0.30	Columbia Lead, Mo.	$10	50,000	$2.50	$3.50
Catherine Lead, Mo.	10	50,000	1.50	2.25	Con. Coal, Ill.....	100	50,000	22.00	23.00
Central Coal & C....	100	51,250	50.50	54.00	Doe Run Lead Co:.	100	15,000	110.00	115.00
Central C. & C., pf..	100	18,750	68.00	75.00	Granite Bimet. Mt..	10	100,000	.46	.50
Central Lead, Mo....	100	10,000	110.00	120.00	St. Joe Lead, Mo,...	10	600,000	14.50	19.25

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust. Meas.	Price.
ABRASIVES—		
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.	$0.08
Grains	"	.10
Corundum, N. C.	"	.07@.10
Chester, Mass.	"	.04½@.05
Barry's Bay, Ont.	"	.07½@.09½
Mont. car-lots, f.o.b. Chicago	"	.07@.07½
Crushed Steel, f.o.b. Pittsburg	"	.05½
Emery, Turkish flour in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Naxos flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Chester flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01½
Grains, in kegs	"	.02¼
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h. gr.	"	26.00
Garnet, as per quality	sh. ton	25.00@35.00
Pumice Stone, Am. Powd.	lb.	.01½@.02
Italian, powdered	"	.01½
Lump, per quality	"	.04@.05
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.03@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
ACIDS—		
Boracic, crystals	"	.10¼@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06
ALCOHOL—Grain	gal.	2.45@2.47
Refined wood, 95@97%	"	.50@.55
Purified	"	1.25@1.30
ALUM—Lump	100 lbs.	1.75
Ground	"	1.85
Porous	"	1.00
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50
AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.04½
AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate	"	.05½
Lump	"	.09
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12
ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.03½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16
ARSENIC—White powd.	"	.029 @.03¼
Red	"	.06⅝@.06¾
ASPHALTUM—		
Ventura, Cal.	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05¼@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
BARIUM—		
Carb. Lump, 80@90%	sh. ton	25.00@27.00
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst.	lb.	.05
Nitrate, powdered	"	.05⅞
BARIUM	Cust. Meas.	Price.
Sulphate (Blanc Fixe)	lb.	$0.02
BARYTES—		
Am. Crude, No. 1	sh. ton	9.50
Crude, No. 2	"	8.00
Crude, No. 3	"	7.00
Floated	"	18.50
Foreign gray	"	13.50
Snow white	"	17.00
Floated	"	18.00
BAUXITE—Ga. or Ala. Mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25
BITUMEN—"B"	"	.03½
"A"	"	.05
BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMINE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
CALCIUM—Acetate, gray	"	1.40
" brown	"	.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00
Carbonate, ppt.	lb.	.05
Chloride	100 lbs.	.70@.90
CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.75@2.00
Foreign	"	1.95@2.50
"Rosendale," 300 lbs.	"	.85
Slag cement,	"	1.50@1.60
CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14
CHALK—Lump, bulk	sh. ton	3.00
Ppt. per quality	lb.	.04@.05¼
CHLORINE—Liquid	"	.80
Water	"	.10
CHROME ORE		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y.	"	9.25
English, common	"	10.50
Best grade	"	16.25
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
COAL TAR PITCH	gal.	.08
COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
COPPERAS—Bulk	100 lbs.	.47½
In bbls.	"	.52½
COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
CRYOLITE	"	.06½
EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32-2-10° Be.)	"	.12½@.12⅝
FELDSPAR—Ground	sh. ton	8.00@9.00
FLINT PEBBLES—Dan. Best.	lg. ton	14.75
French, Best	"	11.75
FLOURSPAR—		
Am. lump, 1st grade	sh. ton	14.40
2d grade	"	13.90
Gravel and crushed, 1st gr.	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.80
Ground, 2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
FULLER'S EARTH—Lump	100 lbs.	.80
Powdered	"	.85
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton	$8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. pulv	lb.	.01¼@.01½
Best pulverized	"	.01¼@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv	"	.01¼
GYPSUM—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
INFUSORIAL EARTH—Gr'd.		
American best	"	20.00
French	"	37.50
German	"	40.00
IODINE—Crude	100 lbs.	2.45
IRON—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03
KAOLIN—(See China Clay.)		
KRYOLITH—(See Cryolite.)		
LEAD—Acetate, white	"	.08¼@.08½
Brown	"	.06¼@.06½
Nitrate, com'l	"	.06⅛
" gran.	"	.08¼
LIME—Com., abt. 250 lbs.	bbl.	.82
Finishing	"	1.02
MAGNESITE—Greece.		
Crude (95%)	lg. ton	5.00@5.50
Calcined	sh. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
" domes., per qual., f.o.b. Pittsburg	"	180.00@200.00
MAGNESIUM—		
Carbonate, light, fine pd.	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
MANGANESE—		
Crude powd.		
70@75% binoxide	lb.	.01¼@.01½
75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, Foreign	unit	.22@.24
Domestic, 1st quality	"	.30
MARBLE—Flour	sh. ton	6.00@7.00
MERCURY—Bichloride	lb.	.77
MICA—N. Y. gr'nd, coarse	sh. ton	33.00@38.00
Fine	lb.	.00⅞@.02
Sheets are sold as to size and quality		
MINERAL WOOL—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
NICKEL Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
OILS—Black, reduced 29 gr.:		
25@30, cold test	gal.	.13@.13½
15, cold test	"	.14@.14½
Zero	"	.18½@.19
Summer	"	.13@.13¼
Cylinder, dark steam ref.	"	.14½@.15½
Dark, filtered	"	.18½@.19
Light, filtered	"	.20¼@.21
Extra cold test	"	.25@.31
Gasoline, 86° @90°	"	.17@.22
Naphtha, crude, 68°@72°	bbl.	12.40
"Stove"	gal.	.15
Linseed, domestic raw	"	.35@.39
Boiled	"	.40
Calcutta, raw	"	.65
OZOKERITE	lb.	.11½
PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	.10¾
Best	"	.14
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd	"	.05½@.06
English flake	"	.08¼@.08½
Glassmakers'	"	.06½@.08¼
PAINTS AND COLORS—	Cust. Meas.	Price
Metallic, brown	sh. ton	$19.00
Red	"	16.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01¼@.01⅞
Orange mineral, Am.	"	.08
Foreign, as to make	"	.06¾@.11½
Paris green, pure, bulk	"	.11½
Red lead, American	"	.06¼@.06½
Foreign	"	.06⅞@.07⅛
Turpentine, spirits	gal.	.59½@.60
White lead, Am., dry	lb.	.05 @.05½
American, in oil	"	.06¼@.07
Foreign, in oil	"	.07 @.09
Zinc, white, Am., ex. dry	"	.04⅝@.04¾
Foreign, red seal, dry	"	.06@.08½
Green seal, dry	"	.06½@.09½
POTASH—		
Caustic, ordinary	"	.04½@.04⅞
Elect. (90%)	"	.06¼
POTASSIUM—		
Bicarbonate cryst.	"	.08½
Powdered or gran.	"	.14
Bichromate, Am	"	.08½@.08¾
Scotch	"	.08½@.09
Bromide	"	@.30
Carbonate (80@85%)	"	.03½@.04¾
Chlorate, powd.	"	.06¼@.07¼
Crystals	"	.06¼@.07
Chromate	"	.35
Cyanide (98@99%)	"	.20
Kainit	lg. ton	9.30
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09½@.09⅝
Prussiate, yellow	"	.14@.14½
Red	"	.36
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41
QUARTZ—(See Silica).		
SALT—N. Y. com. fine 280 lbs	bbl.	.72@1.12
N. Y. agricultural	sh. ton	4.40
SALTPETRE—Crude	100 lbs.	3.35@3.40
Refined	"	4.00@4.50
SILICA—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord.	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Chloride	oz.	.46
Nitrate Crystals	"	.39¼
Oxide	"	.85@1.10
SODIUM—		
Bicarb., ord., bulk f.o b. wk's.	100 lbs.	1.25
Extra domes., f.o.b. w'ks.	"	3.50
Foreign, f.o.b. N. Y.	"	1.60
Bichromate	lb.	.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.75@.80
Foreign, f.o.b. N. Y.	"	.90@.92½
Caustic, 70@76% f.o.b. w'ks.	"	1.75@1.80
" 60%	"	1.85@1.90
Foreign, f.o.b N. Y.	"	1.90@2.00
Chlorate, com'l	"	.06¾@.07
Hyposulphite, Am.	"	1.60@1.65
German	"	1.70@1.90
Nitrate, nearby	"	2.15
Shipments	"	2@2.05
Peroxide	lb.	.45
Phosphate	"	.02½@.02¾
Prussiate	"	.10½
Sal soda, f.o.b. works	100 lbs.	.60
Foreign, f.o.b. N. Y.	"	.67½
Silicate, conc.	lb.	.05
Com'l	"	.01
Sulphate, com'l	100 lbs.	.82½
Sulphide	lb.	.01¾
Sulphite crystals	"	.02½
SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.25
TALC—N. C., 1st grade	sh. ton	20.00
N. Y., Fibrous, best	"	10.28
French, best	100 lbs.	2.00
Italian, best	"	2.25
TAR—Regular	bbl.	2.70
Oil, bbl.	"	4.70
TIN—Crystals, bbl	lb.	.20
Oxide	"	.45
URANIUM—Oxide	"	3.25@3.00
ZINC—Metallic, ch. pure	"	.07@.09⅛
Carbonate, ppt.	"	.09
Chloride solution, com'l	"	.02¼
Chloride granular	"	.15
Dust	"	.04¾@.04⅞
Sulphate	"	.02¼@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.85
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07½@.08¼
THORIUM—Nitrate 49@50%	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.